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MODERN PHYSIOLOGY HYGIENE AND HEALTH

A STUDY IN VOCATIONAL AND COMMUNITY HYGIENE

GOOD NEIGHBORS

BY

MARY S. HAVILAND

GHT - HEIGHT - AGE TABLE FOR BOYS OF SCHOOL AGE

BY

DR. BIRD T. BALDWIN and DR. THOMAS D. WOOD

Av. Wt. for Ht. Lbs.	5 yrs	6 yrs	7 yrs	8 yrs	9 yrs	10 yrs	11 yrs	12 yrs	13 yrs	14 yrs	15 yrs	16 yrs	17 yrs	18 yrs	19 yrs	Ht. Ins.
34	34	34*														38
35	35	35*														39
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39	39	39	39*	39*												42
41	41	41	41*	41*												43
44	44	44	44	44*												44
46	46	46	46	46*	46*											45
48	47*	48	48	48	48*											46
50	49*	50	50	50	50*	50*										47
53		52	53	53	53	53*										48
55		55	55	55	55	55	55*									49
58		57*	58	58	58	58	58*	58*								50
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64			63	64	64	64	64	64	64*							52
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71				70	70	70	70	71	71	72*						54
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111							105*	106	107	108	110	113	118	123	127*	63
117								109	111	113	115	117	121	126	130*	64
123								114*	117	118	120	122	127	131	134	65
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133									124*	128	130	134	136	139	142	67
139										134	134	137	141	143	147	68
144										137	139	143	146	149	152	69
147										143	144	145	148	151	155	70
152										148*	150	151	152	154	159	71
157											153	155	156	158	163	72
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169											160*	164	168	170	171	74

Years		6	7	8	9	10	11	12	13	14	15	16	17	18	19	
	Short	43	45	47	49	51	53	54	56	58	60	62	64	65	65	
	Med.	46	48	50	52	54	56	58	60	63	65	67	68	69	69	
	Tall	49	51	53	55	57	59	61	64	67	70	72	72	73	73	
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Notes:

1. Age is taken at the nearest birthday; height at the nearest inch; and weight at the nearest pound. A boy is considered 6 years old at any time between 5½ and 6½ years.
2. The following percentage of net weight has been added for clothing (shoes, coats, and and sweaters are not included):

   For weights from 35 to 63 lbs.—3.5% of net weight is added.
   For weights 64 lbs. and over—4. % of net weight is added.
3. The figures not starred represent exact averages in round numbers.
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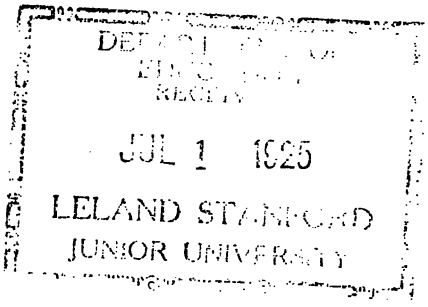

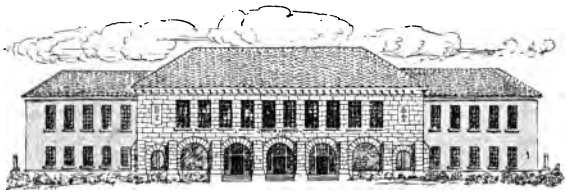

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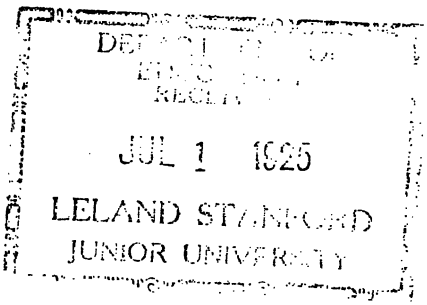

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ABRAHAM LINCOLN
WORKER AND CITIZEN

LIPPINCOTT'S SCHOOL TEXT SERIES
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DEAN, COLLEGE OF EDUCATION, STATE UNIVERSITY OF IOWA

MODERN PHYSIOLOGY HYGIENE AND HEALTH

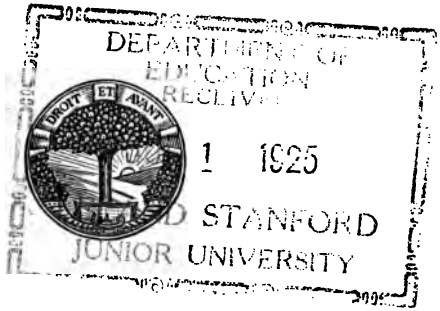
GOOD NEIGHBORS

A STUDY IN VOCATIONAL AND COMMUNITY HYGIENE

BY

MARY S. HAVILAND
RESEARCH SECRETARY OF THE
NATIONAL CHILD WELFARE ASSOCIATION, INC.
AUTHOR OF "THE MOST WONDERFUL HOUSE IN THE WORLD" AND "THE PLAYHOUSE"

ILLUSTRATED



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PREFACE

Into our factories and shops, on to farms and ranches, into business houses, offices and domestic service, wherever willing hands are needed, there pours every year a flood of young life. Every year a million children between ten and fifteen years old leave school to go to work.

Every year, too, sees the advent of two million young voters, youths and maidens who have attained their coveted majority and who are legally, if in no other respect, ready for the vote.

How well are these young workers and citizens prepared for their tasks of labor and of democracy?

Four million American school children are handicapped by mouth breathing, caused by tonsils and adenoids. Five million have trouble with their eyes. Eight out of every ten have seriously defective teeth. One million have something wrong with their ears. Two million have flat feet or crooked spines. One in every three is underweight, undernourished, or malnourished.

How can these children do good work with such poor bodily tools?

As to preparation for citizenship,—for real community service,—how many of our young folks are given any actual training at all?

And yet the success of any civilization must rest upon the health of its workers as individuals and as community members.

This little book is an attempt to make the future worker and citizen realize that only as he forms and keeps health habits, can he be happy and successful, and that only as he and his fellows contribute to the health of their communities can American democracy realize its ideals.

Many friends have aided in the preparation of this book. Especial thanks are due to Dr. W. F. Russell, Dean of the College of Education of the University of Iowa. To Miss Emma Dolfinger, of the Normal School of Louisville, Kentucky, I am indebted for the valuable suggestions at the end of each chapter.

MARY S. HAVILAND

PART I
THE WORKER'S TOOL CHEST

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THE WORKER'S TOOL CHEST

THE WORKER AND HIS TOOLS

THE other day, when I had to pay a visit to the dentist, I amused myself by admiring his tools. So many of them, and yet he always knew just which one to use. And they were all so shining and free from any speck of dirt or rust. I remarked to the dentist how well he seemed to be acquainted with his instruments and how polished he kept them. He smiled and said, "A good workman is known by his tools and he also *knows* his tools. You can't do good work with poor tools, nor can you work well with tools of which you know nothing."

As I walked home, I thought how little most of us know about those wonderful tool-chests, our bodies, or of how to keep our tools clean, sharp and ready for use.

During the war, I knew, as I suppose everyone did, a great many disappointed young men who were rejected as unfit for service. Tom had weak lungs. Will had flat feet. Henry's eyes troubled him. Sam's spine was a trifle crooked. Thousands and thousands of young men all over America went sadly home from the recruiting office, because of some bodily defect.

Many of these troubles were cured and later the young men entered the service, but in many cases, the trouble should have been prevented or cured in boyhood and now it was too late. Many and many a brave young man thought bitterly, "Why was I not shown, ten years ago,

how to take care of my body? Then I could have been of some use now, instead of being pushed aside."

Of course we all hope that we shall never have another war, but whether we do or not, in peace as well as in war, America needs strong, healthy, happy worth while men and women. Soldiers are carefully examined before they enlist, their weaknesses and defects are treated, they are taught how to keep well and then trained to hard work, cool nerves and endurance. Just so, you girls and boys who are soon going to enter the battle of life, must make yourselves "fit to fight" by discovering and curing any weakness, making your bodies like clean, sharp, ready tools, and learning how to keep them so.

I suppose most children, when they are little, think very little about their bodies. I know that, when I was small, I gave no thought to my body at all unless I fell and bruised my knee, or ate too much and had a stomach-ache, or in some other way mistreated my body so that it cried out and forced itself on my attention. But when I grew older, I began to think of my *self* as living in my body, and I realized that if I took no care of this house in which I lived, I could not play and enjoy myself. And when I was older still, and began to think of earning my own living, I saw clearly that my body was not merely a pleasure-house in which to enjoy myself, but that it was also a chest of tools with which I must earn my living. I saw that all my happiness and usefulness in life, my success and worth-whileness, would largely depend on knowing how to use my body and how to keep it strong and fit for service.

Earning one's living may be the most tiresome drud-

gery and it may be a source of never-ending interest and pleasure. Whether it is one or the other depends somewhat on the work, but largely on the health of the worker. Therefore I wish there were a law that everyone of you boys and girls should not only have finished a certain grade in school before you go to work, but also that you should, like soldiers, be of a certain weight and in good health. And I wish, too, that you could all be taught and trained in health habits. You would do more work, better work, earn higher wages and have more fun while earning them. You would feel, as you ought, that work is really far more interesting than play. If every boy and girl felt this, what a busy, happy nation of workers we should be!

THE WORKER AND HIS TOOLS

Think about what you would most like to do or be, when you are old enough to leave school. How will a strong body help you succeed in reaching your ideal?

How will such a body add to your joy in life, as well as to your usefulness?

STAND UP FOR YOURSELF

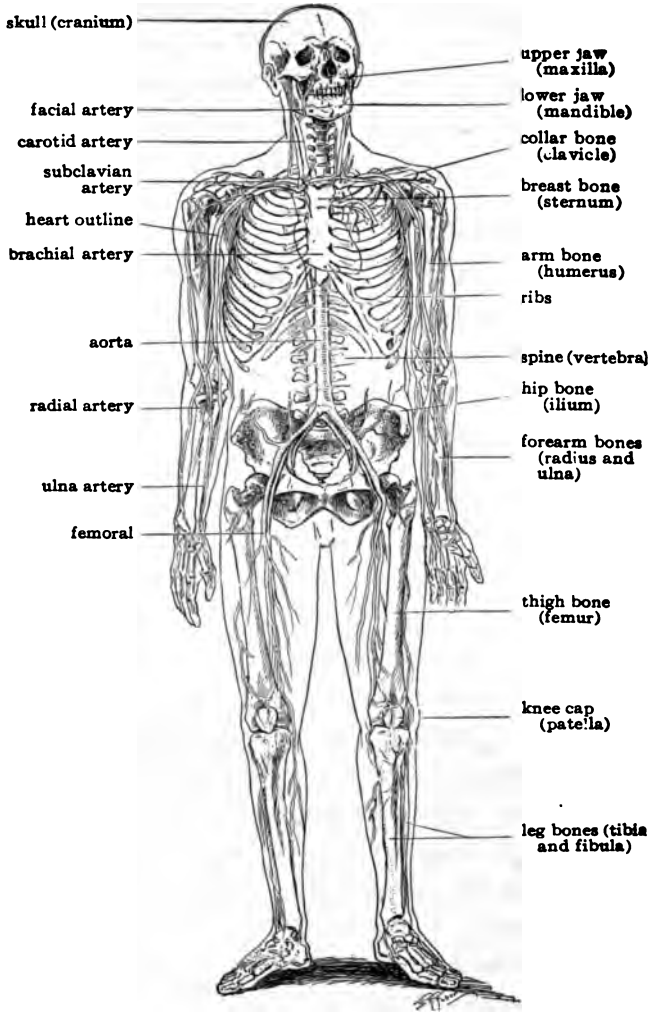
One of the very first things that a workman needs is tools that are not bent or twisted and apparatus that is straight and stands steadily. A carpenter who has only crooked nails, and who works on an uneven, unsteady table cannot turn out good work.

I suppose you have often seen a carpenter's rule, his T square and the spirit level with which he makes sure that his work is perfectly even and stands solidly and well balanced. But I wonder whether you have ever thought how wonderfully balanced your own body is.

Most things in this world are made so that they stand firm and solid. The roots of most trees spread far and wide under the ground, much farther than their branches. The lower animals and insects stand on four or more legs, with no fear of losing their balance. The things that man makes are built either with a solid base deeply rooted, like our "sky-scrapers," or with good, substantial legs, like our chairs and tables. We never build things "topheavy" and delicately balanced on a small base, for we know from experience how easily such things are overturned.

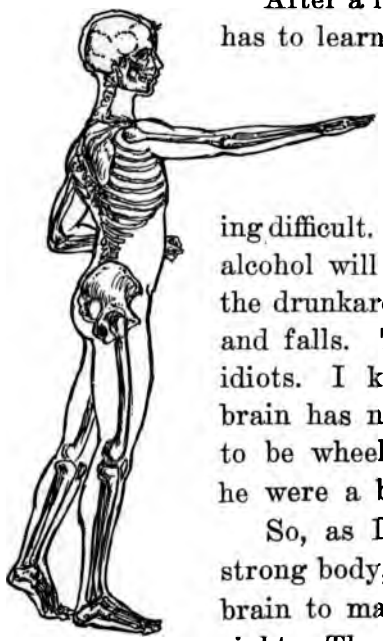
But now look at your own body. It is much larger around the shoulders and hips than around your feet. You are somewhat the shape of a ninepin, ready to be knocked over by the first light tap! We have grown so used to balancing ourselves that we do it without thinking. We have forgotten the days of our babyhood when we stood

with legs far apart, so as to have a wider base, threw out our arms and balanced ourselves with almost as much



Skeleton with blood vessel system.

care as we should need now in walking a narrow plank over a chasm. We balance ourselves with perfect ease and walk without giving our feet a thought. But we do so only so long as our bodies and brains are both strong and healthy.



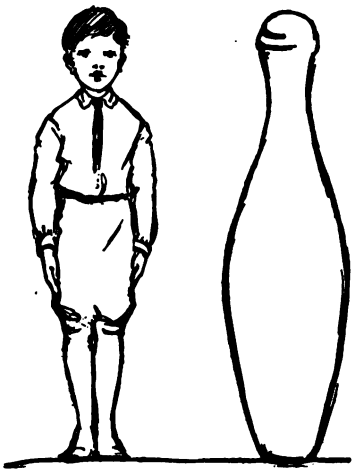
After a long illness, the invalid often has to learn to walk all over again, for he has lost the habit and his muscles are weak, like a baby's. Often, too, a weak brain will make walking difficult. A brain that is muddled with alcohol will not guide the muscles and the drunkard cannot walk, but staggers and falls. The same thing happens to idiots. I know a poor fellow whose brain has never developed and he has to be wheeled about the streets as if he were a baby.

So, as I said, it needs not only a strong body, but a well-developed, clear brain to make a man hold himself upright. The minute the muscles give way, or the brain loses control, the body sinks to the ground. Even when the muscles or brain are a little tired, the body tends to sag and "cave in."

The reason of this sagging is that the body is not "all in one piece," like a ninepin, but is built in sections, as it were. The backbone is made of twenty-four small bones, or vertebræ. The legs are divided by joints at the hips, the knees and the ankles, and the muscles attached to

these joints help to hold the different parts of the body in position.

Now, when we stand in an erect position, as you can see from the picture, all the various parts of the body are evenly and solidly balanced one over the other, like a well-built tower, and we can stand so a long time, without tiring. But if we stand with the head forward, the chest caving in and the stomach—or abdomen, to use its correct name—thrown out, the body is like a pile of blocks laid "every which way" and ready to fall down any moment.

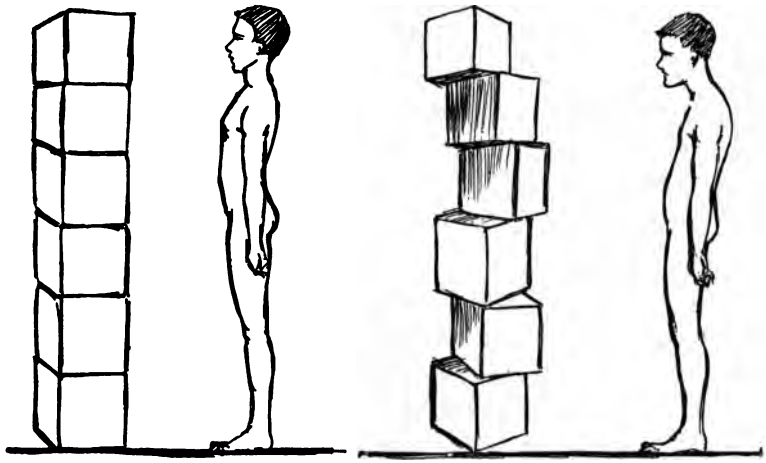


An erect posture, when you have once gotten into the habit, is really much less tiring than a "slumping" one. Moreover, it allows all your organs to do their work properly. And last, but perhaps not least, it gives you a sense of self-respect and makes other people respect you more. A boy who goes about with his head hanging, his shoulders humped and his feet dragging, *may* be a live, energetic, worth while fellow, but he will have to prove it. But what business man would not be glad to employ such a fellow as the "Concord Minute Man?" His head is up, his chest is up, he stands strong and sturdy, ready for anything.

Now, how shall we go about correcting the habit of

wrong posture? I remember reading of a man who formed good posture habits by imagining that when he walked, a cord was fastened to the top button of his vest and was pulling him forward. I've tried it myself and it really is a wonderful help in walking well.

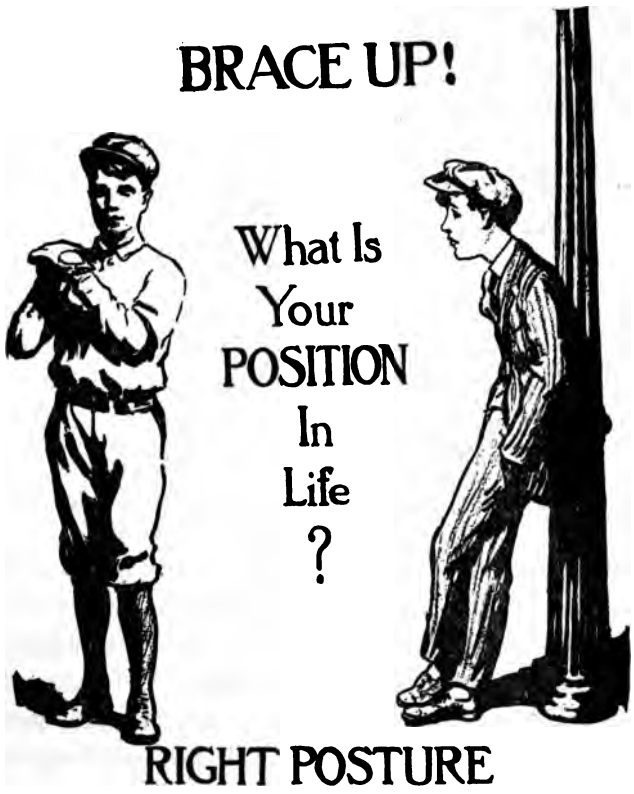
In standing, remember to hold the chest up—not stiffly like a pouter-pigeon—but just naturally and comfort-



ably. Then sway forward until you can rise on your toes. Lower your heels and let the weight of the body continue to rest on the balls of the feet. This will give you a natural, easy position, with the parts of the body one over the other, not broken up into wobbly joints, such as I compared to a pile of tottering blocks.

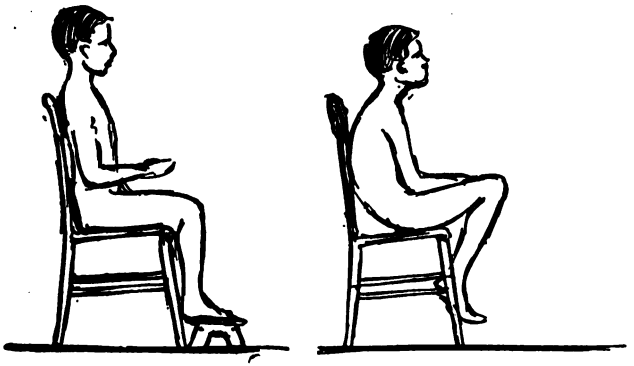
I suppose a good many of you will work at something that may require you to sit during a large part of the day, so that it is very important that you should sit in the easiest and best position. Now the thing that is easiest and best means the thing that is most natural and causes

least strain. If you sit with your shoulder blades and the end of your back resting against the chair-back, like



this, and your feet flat on the floor, or on a foot rest like this, you will have a sense of solidity and strength,

because the parts of your body are resting, one over the other, as they were meant to. But if you sit, as so many people do, with your shoulders drooping forward, and the end of your spine sliding forward, your whole body will be cramped, you cannot take a deep breath, and you will get far more tired. Just try sitting in this attitude and



try to take a good, deep breath. It is almost impossible.

Of course, when you are employed, you cannot always have a chair of exactly the right height and shape. But "where there's a will, there's a way." I know a girl who, if her chair is too high, puts a box under her feet and if it is too low for her arms to rest comfortably on her work-table, she puts a cushion or pile of newspapers on the seat, to raise her. The girls who work in her room used to call her "Miss Fussy," but they have begun to see that she can work longer and faster than they without growing so tired and they are following her example.

Another thing to remember is to lean forward *not* by humping the shoulders and bending the back, but by

swaying forward *from the hips;* that is what your hip-joints are for, so that you may bend forward easily and comfortably. Try both ways and see how much more comfortable the hip-bend is.

One of the things that helps most in getting the habit of good position is to *think* right. If you start off to your day's work thinking, "Oh, dear, I shall never amount to much. I have no 'pull' and I'll never be advanced. My work is so stupid and I do so hate it!" If, I say, you start out like this, your head will droop, your chest will cave in, your feet will drag and you will not only feel, but *look* like a failure. Your bad posture will injure your health and the chances are ten to one that you will *be* a failure.

But if you set forth thinking, "I'm going to see how much I can do today and how well I can do it and how much fun I can get out of doing it," your head will come up, your chest will rise of its own accord, you will walk along easily and lightly. You will feel and look happy and successful and your good position and bright thoughts will help you to keep well, and keeping well is one of the first steps to success.

No one likes a grouchy, slouchy, caved-in sort of person. *Stand up* for yourself!

STAND UP FOR YOURSELF

Can you keep your balance while riding in a street car, without using the straps? Explain to your satisfaction, how you do it.

Can you explain why you cannot knock over the baby's "tumble-toy"?

How do you save yourself from falling when you slip on the ice? Why are you able to do this?

(You may not be able to answer all these questions, but by trying you will find out some interesting things about keeping your balance.)

List all the advantages you can, of a body framework composed as ours is, of separate, moveable pieces of bone. Disadvantages. How can we overcome the latter?

Learn from your physical training teacher, the correct standing posture. Is *your's* good? Make a resolution to keep correct posture. Can you do this for a whole day? A week? Get some one to judge you, and keep a score on yourself to help you remember.

Find out what kind of seat favors good sitting posture. Always change any seat you may have to occupy for a long time to fit this knowledge, as far as you are able to. Find out how to sit correctly and comfortably. Act on your knowledge. Are you sitting correctly this minute? If not, how can you correct your posture?

What experience have you had, or observed in others, that proves this point:—"Good posture always goes with a happy, joyous feeling of activity."

What experience have you had that proves this statement:—"We have faith in those people who stand straight, with heads held high—and an air of self-confidence?"

WATCH YOUR STEP

When I was shopping yesterday, I heard one of the saleswomen say to another, "My goodness, how my feet do ache! I can't think what ails them." Just then she stepped out into the aisle and as she walked, or rather, *hobbled* away, I thought to myself that I could make a guess at several things that were wrong with her feet.

She was wearing a pair of laced shoes that were drawn so tight around her ankle that the flesh bulged out above the shoetop. Her heels were "French," and badly worn on one side, so that her weight fell on the inside of her foot and the ankle bones jutted out and almost struck each other when she walked. As she came walking back, I saw that the shoes were of patent leather, with very narrow, fancy tips. I did not say anything to her, for I was afraid she would think I was interfering, but it did seem a shame for any girl to try to stand and work on such a pair of feet.

I suppose most of us value our feet very highly. At least, when we pass a crippled soldier, we say, "Oh, how terrible to lose one's foot!" And yet most of us really abuse our feet shamefully—quite as if we thought we could buy a new pair whenever we wanted them.

There are three different ways in which a great many people abuse their feet—by standing and walking incorrectly, by clothing the feet wrongly and—shocking as it sounds—by not keeping them perfectly clean.

To begin with the first mistake, that of standing and walking incorrectly. It is important to understand the

general plan on which our feet are built. If you examine your foot and your hand, you will see that they are really a good deal alike, except that your fingers are much longer than your toes, and that you can move and control them much more easily. As the picture shows, the bones of the foot form a slight arch, from the heel to the ball of the foot, and if you look at your hand, you will see that the bones of the hand arch slightly in the same way, from the wrist to the knuckles. The picture does not show it so clearly, but in addition to the arch which runs from end to end of the foot, there is another arch, *across* the foot just where the toes begin. You can plainly see this arch in your palm, under the knuckles.

Now what are these arches for? In the first place, they act as springs, to keep the body from unpleasant and dangerous jars. The arches are held together by strips of strong connecting tissue called tendons, just as the string of a bow stretched from one end to the other, holds the bow in its arched shape. These arches put a comfortable air cushion under your foot, so that when you walk, you don't come down with a thud, but walk easily and with a spring. Beside this, there are nerves and blood vessels under our insteps which would be hurt if they had to bear the weight of our bodies.

When I was little, I was always urged to turn out my toes, for in those days, it was considered more elegant, and nobody seemed to know that it was bad for

your feet. If you will try standing with your feet well turned out, you will see that it throws the weight of your body on the *inside* of your foot, tends to make your knees knock together and makes your ankle bones stick out on the inner side of your ankle. If you think a moment, you will realize that this throwing of all the body's weight on one side of the arch must strain the tendon that holds it up and tend to flatten or break down the arch. And if you compare the print of a natural foot with that of a "flat foot," you will see that in the latter the arch is flattened out and the foot is flat on the ground. With such a foot, it is hard to walk or stand long and the whole body tends to be thrown out of balance. Any one who has broken down or weak arches should avoid that which will keep him on his feet much.

People with broken arches often wear stiff arch supporters in their shoes, but this is like depending on crutches instead of developing strong muscles. If your ankles are weak, and long standing or walking makes your feet, ankles and even legs pain you, you need some exercise to strengthen the foot muscles. Captain J. R. Harris, a physician in the United States Medical Corps advises the following exercises, to be taken barefoot.

1. Rise on toes as high as possible, then slowly lower heels to ground.

2. Standing on heels, raise toes as far as possible. Then relax.

3. Raise body by grasping at the floor with toes. Try not to use the leg muscles, but grip strongly with toes.

4. Cross right foot in front of left and sway your weight from left to right by actively pushing with your toes. Reverse your feet and repeat.

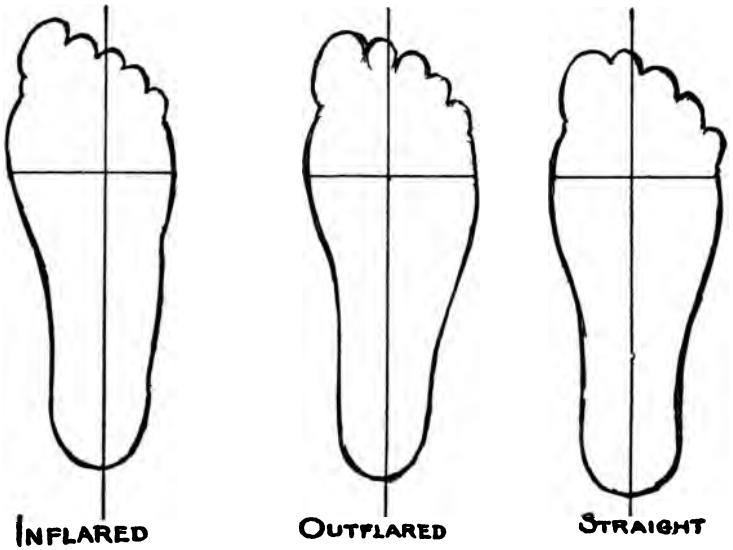
5. Stand with the top of your left foot in the hollow of your right knee and swing about, balancing on your right foot. Change and balance on left foot.

Each of these exercises should be repeated for several minutes as many times a day as you have time. At morning and at night they can be done barefoot, but even with the shoes on, they are of value in strengthening the foot and ankle. Just compare your helpless toes with those of a baby. His are almost like fingers, and so should ours be, if we gave the poor things a chance to exercise. When I wake in the morning, I always, before getting out of bed, exercise my toes a bit, trying to grasp the sheet with them, seeing how far apart I can stretch them and how far back and up I can bend them. It is really very good fun and it limbers one up for the day.

Of course, the great trouble is that we coop our feet up in stiff, badly shaped shoes for fourteen to sixteen hours a day. No wonder that the poor things grow misshapen and ugly and weak, instead of being strong

and swift like the animals' feet, or beautiful and flexible like the baby's.

The American Posture League, an organization of people especially interested in teaching everyone how to stand and walk well, has measured thousands of feet and as a result, they found that there were three differ-



ent types of feet. They call these feet "inflared," "outflared" or "straight" according to whether, when a line is drawn straight through the back of the heel, the greater width of the sole falls *inside* this line, *outside,* or whether the width is evenly divided.

And yet, most people buy shoes to suit their eyes, rather than to fit their feet. If pointed toes are in fashion, we wear pointed toes. If French heels are the style, we perch our feet up in an unnatural position on French

heels. It seems rather silly and tiresome for everyone to dress alike, but when you think of all the poor feet of different shapes crowded into one shape of shoe, it seems not only stupid, but wrong, for it makes free play impossible and work very difficult. When I see a shop girl hobbling about her tasks, I remember someone's remark that "If your mind is on your feet, it can't be on your work."

Of course, the ideal thing would be to go like savages, without any shoes. I never heard of a savage who had corns or bunions or weak arches. But city streets contain glass, nails and other things that may cut or injure our feet. The pavements in summer are burning hot and in winter we should be too cold. Some sort of foot covering we must have to protect the feet from injury and to keep out the cold and wet.

How shall we choose our shoes? Of course, I understand that no one wants to look "queer" and different from everyone else. I am not going to advise you to wear Indian moccasins on Broadway. I know, too, that the question of expense is a serious one, for most of us cannot afford to buy extremely high-priced shoes. But a shoe is not "cheap" if it ruins your feet and prevents your working.

By tracing an outline of your bare foot as you stand on a piece of paper, you can find just how long and wide the sole of your shoe should be. To squeeze your foot into a shoe whose sole is too narrow is as silly as the Chinese custom of shortening the foot by binding it. The

Chinese are beginning to see how foolish their custom is, and let's hope that we shall soon be more sensible, too.

The second thing to remember is that the heel should be low, and broad enough to support the foot steadily, so that the ankle will not turn and the body be thrown out of balance. Rubber heels prevent the body from being jarred at each step.

Thirdly, the toe should be wide enough to let the toes move about freely.

Fourthly, the inner side of the shoe should be so shaped that the toes can point straight ahead. You will see in the picture how a wrongly shaped shoe bends the big toe out of line and causes a swollen, ugly joint.

Lastly, the shoe should be soft and easily bent, both upper and sole, so as not to cramp the movements of the foot, and it should be of porous leather—that is leather in which the natural, tiny holes remain, so that the air is not entirely shut out. Patent leather is not porous and makes the feet hot and uncomfortable. A great many people find the same trouble with box calf.

But even if you walk and stand correctly and wear well-fitting, sensible shoes, your feet may trouble you a good deal if you do not give them proper care. The feet are shut up all day in a close-fitting prison. At night, when you get home, change to a pair of house slippers.

I used to know a boy who was so distressed with aching, swollen, tired feet that he thought he would have to give up his work as an elevator boy and find something that would enable him to sit down. He asked a friend who was a trained nurse what he should do about it and she said, "Well, if you will promise not to be offended,

my opinion is that your feet need not less standing, but more bathing."

This boy had always thought he was clean, for he took two or three baths a week and changed his clothes twice a week. But after this, he formed the habit of bathing his feet, or soaking them a few minutes in hot water every night before he went to bed. In the morning, he washed them in cold water and put on clean socks. A pair of clean socks every day seems a good many perhaps, but he told me that he simply rinsed out his socks each night and they dried by morning. This not only kept his feet much more comfortable, but the socks lasted longer. Every night he was careful to *air* the inside of his shoes, loosening the laces and pulling out the tongues so the air could get to them. He was also careful about geting his feet wet and about wearing rubbers in the house. He had not tried this for a week before he realized that the nurse was right—his feet had pained him because they were not clean.

During the war, the utmost care was given to the soldiers' feet. How carefully we knitted their socks, so that no seam or knot should chafe them. Every man was taught just how to stand and walk, how to take care of his precious feet. And the army boots were made exactly right in order that the men might endure the long marches over rough ground.

The war is over, but the men will never forget the lessons they learned in the care of their bodies, while they were in the service. All of us would do well to care for our feet as carefully as if we were soldiers. If our feet fail us, we cannot work well, we cannot take

long country rambles, we cannot dance or play with any comfort. A pair of good, sound feet is one of the best tools any worker can have.

WATCH YOUR STEP

Suppose you are the school-nurse, and a girl comes to you for help because her feet ache all the time. What three things must you find out about her feet, before you can help her?

Make a print of your bare foot on a piece of paper and compare it with a flat-foot and with normal foot prints. Which is yours? Locate the two arches on the normal print, and on your foot. Now try to explain how these arches are built, and why they are helpful to us, so that your little sister or brother could understand.

Policemen are not taken on the force in some cities if they are flat-footed. Can you explain why arches are thought so important for policemen?

Demonstrate to the class five exercises that strengthen arches and ankles. Teach these to some other person.

Indians were able to tell tracks made by themselves from tracks made by whites, even when wearing moccasins of the same kind. How could *you* do this? Walk like an Indian now. What is the advantage of this kind of walking over ours?

Go downtown and notice five defects in shoes offered for sale. Find a good-looking and *hygienic* shoe for a man. A woman. A child. Which was easiest to find? What were the good points you looked for? Which cost more—the hygienic or the unhygienic? What defects and what good points have your present pair of shoes?

Find out how to care for shoes, to increase their serviceableness. Do you so care for your shoes?

As the school-nurse, what would you say to children about the way to keep their feet free from corns, calluses and other foot troubles?

As nurse, what would you tell the children about the selection and care they should take of their stockings?

Are you able to keep the above directions for two weeks? Keep a record of your experiences in trying to keep the rules. Have they helped you?

THE MEANING OF MOTION

I REMEMBER once seeing a very amusing motion picture which showed an old carpenter fallen asleep over his work. No sooner had his eyes closed than his tools all sprang into life. The nails stood on end while the hammer pounded them in. The plane sent shavings in all directions. The saw whizzed through a board, and the auger whirled around like a ballet dancer.

As we left the theater my little nephew, who had been with me, said, "I'd like to have a set of tools like those—tools that were alive."

It set me thinking about these bodily tools of ours and of how live tools differ from dead ones. It seemed to me that a hammer differs from a fist, and a pair of pincers differs from a pair of fingers in two very important ways—ways in which all things that we call alive differ from dead wood and stone. In the first place, they *move,* and secondly they *renew and repair themselves.*

Anyone who wants to be well and to work well must move rightly and must renew and repair himself rightly.

If you have ever tried it, you know how impossible it is to keep absolutely motionless. Even if you try not to move a muscle, the muscles that control your breathing and the beating of your heart keep on going. The blood keeps moving through your veins, just as the sap flows through the tree and the juice through the flower. When motion stops, life stops. When the child plays about, running and jumping, we say, "How *full of life* he is!" The word *quick* used to mean merely *alive,* and the Creed

speaks of "the quick (meaning the living) and the dead."

Those of you whose older brothers or friends were in the medical corps of the army know that they wore on their collars a wand with two snakes twined around it, like the wand carried by the Greek god Hermes, in the picture at the beginning of this chapter. Doctors use this snake-twisted wand because Hermes was the god of medicine. He was also the messenger of the gods and the god of athletics. His wand, like a king's scepter, was a sign of his power. The snakes twined round it stood for wisdom, and the wings at its top for speed. You see the Greeks knew but little about medicine, but no one has ever known better than they how to develop strong, swift bodies.

In Athens it was a very important part of every boy's education to learn to race, box, wrestle, jump, throw the discus and compete in all sorts of sports. Every year a great athletic contest was held called the "Olympic Games," and the best athletes from all over the country met at Athens.

In England, too, outdoor sports have always been popular. Before guns were invented, every soldier learned to use a bow and arrow. The people loved to

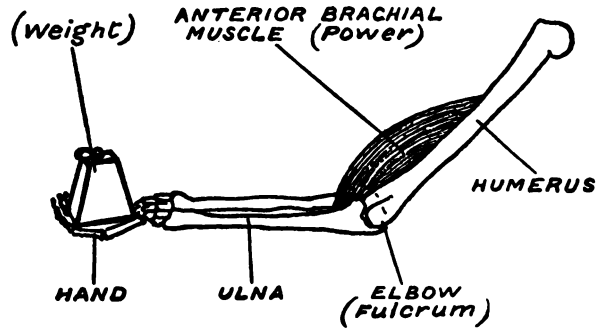
ride, fence, wrestle and put the shot. Indeed, they were so fond of these games that King Edward III forbade them, because he said the people were neglecting their practice with the bow and arrow and would be unprepared in case of war. In English stories such as the tales of Robin Hood and Ivanhoe, we get a wonderful

picture of the common people playing at fighting with big staffs called quarter-staves, while the knights rode in tournaments and the ladies, poor things, had to play the harp, or sing or sew, and seem to have had but little chance for exercise.

It is this love for outdoor sports that has made the modern Englishman and American so strong and healthy. We think of savages as wonderfully strong and athletic, but in 1904, at the St. Louis Exposition, a modern Olympic contest was held in which Indians, Africans, Moros, Patagonians, Filipinos and other savage races took part. To everyone's surprise, they could neither throw, shoot, lift weights, run nor jump anywhere near so well as the white men—which shows that skill in athletics, like skill in everything else, requires brains as well as muscles.

In olden times, when men made their living by farming,

hunting, fishing, and other hard, outdoor work, they got plenty of exercise in that way, and nowadays there are still people whose work gives them a great deal of exercise. But farmwork often overworks certain muscles and under-exercises others. The right sort of games and exercise will help farmworkers to *all-round* development. As for those of us who are going to be clerks, dressmakers, doctors, stenographers, or teachers, or who are going to work in a shop or factory where we bend over one task and use one set of muscles all day, we especially



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need to think more about this question of motion or exercise.

As you probably know, your bones are connected and held in place by numerous muscles. You have all seen raw meat and therefore know what muscle looks like. Muscle is elastic. If you clench your fist and draw it up as hard as you can to your shoulder, you will see the muscle in your upper arm bulge up, for instead of being stretched out taut, as it usually is, it is now tightened up and made thicker.

Now what does exercising our muscles do for them and for our health?

In the first place, it makes the muscles stronger. If you lie perfectly still in bed for a week, you will find that your leg muscles tremble and almost refuse to hold you up. As many writers have pointed out, the human body is the only tool that grows stronger with use. That is why babies, kittens, puppies and all young animals spend most of their time, when awake, in motion. That is why the muscles of the blacksmith are "strong as iron bands." And that is why so many people do not enjoy long walks, hard climbs and vigorous games. They have let their muscles go without exercise for so long that they have become soft and weak.

Another way in which exercise helps the body is that it makes the heart pump more rapidly and the breath come more quickly and from deeper down in the lungs. You know from experience how your heart thumps and how fast you breathe after a run. Rapid exercise has somewhat the same effect on your body that shaking has on a furnace fire. You know that when the fire is dull and choked with ashes, a good "shaking down" will get rid of the ashes, make a better draft through, and liven it up so that it is ready for more coal.

In the same way, when you exercise, your body, through

breathing more rapidly and perspiring, throws off the waste matter that has choked it and you are "livened up" all over, your digestion is better and you have a better appetite.

The best sort of exercise is that taken outdoors in the form of games, for what we enjoy always does us more good than a mere task. If you work in an office or factory where you get little exercise and fresh air, you ought to make a great effort to get some air and exercise on your way to work and going home. I remember a girl who left school to go into a candy factory. She sat all day at a long table packing candies into boxes. The air was close, the smell of the chocolate, all day long, sickened her, she humped more and more over her work and every day she grew paler and more tired.

Her mother grew quite worried about Mabel and asked the doctor what medicine she needed. The doctor advised no medicine but added, "Tell Mabel to ride to work on the platform of the elevated road instead of in a subway train. Tell her at noon to go out and take a brisk walk—*brisk,* mind you, not a lady-like saunter. At night, she should walk as far as she can without getting overtired and then ride the rest of the way home."

Mabel tried it and it not only made a great difference in her health and happiness, but she got into the *habit* of exercise—and there is no better health habit in the world.

In addition to getting some exercise going to and from work and during the noon hour, those of us who are indoors all the week ought to try to get some good exercise in the evening and on holidays. Motion pictures are

good fun—I am fond of them, myself—but they are not a very good way to spend many evenings, if you have

been spending the day in the same way, sitting in a rather close room. I wish every girl or boy would join a Y. W. C. A., Y. M. C. A., or other club where she or he

could play basket ball, dance, swim, and have a good time exercising every muscle in her or his body.

And then there are the Scouts, both Boy and Girl, the Campfire Girls and other clubs, where you can form a delightful circle of friends and do a lot of delightful things, such as taking country "hikes," having picnic suppers, going on week-end camping parties, going swimming and boating, having clam-bakes and dozens of other pleasant things.

Of course I know that it is not quite so easy to do these things in the city as in the country, but a five or ten cent fare will take you out into the country or down to the shore and then you can tramp off into the wilds. It will do you more good and be more fun than any "movie" or dance hall you ever went to. I am not objecting to motion pictures and dancing, but very often, usually in fact, they shut you up for the evening in dusty, bad air with a crowd of coughing, sneezing people, instead of taking you out under the sky in the fresh air and among the cool silences and sweet odors of the woods.

Another thing that is helpful, though it never takes the place of outdoor sports, is to go through some simple exercises in your room at night and morning. Always take them either without clothing or in your nightclothes, for you want the muscles to have free play.

To limber the backbone, stand with the weight on the balls of the feet. *Keep the knees stiff* and bend over as far as possible, trying to touch the floor. After some practice, you can really touch it. I know a lady who can lay her palms flat on the floor.

To strengthen the muscles of the back and shoulders, when your work has kept you bending forward all day, lie flat on your stomach, with hands on hips. Then raise your head and shoulders as far as possible.

It is very important that the muscles of the abdomen should be strong, for these muscles hold the bowels and other organs in place. Weak abdominal muscles are one great cause of constipation. To strengthen these muscles, lie on your back with your hands under your hips and raise first one leg, then the other, then both together straight up in the air, at right angles with your body. This is hard work at first, but some people grow so strong and so limber that they can not only raise the legs to a right angle, but can carry them clear over the head, so that the toes touch the ground over the head.

The whole point in doing any sort of exercises in your room is to do them for a few minutes *every morning.* Exercise, like everything else, needs to be taken regularly, for our bodies are very much like machines. Our hearts beat with a regular, measured swing. Our lungs send out and draw in the air with a regular tide, just as the waves run up on the beach and then ebb back to the sea. Our whole life is motion, but it is *regular* motion.

And another thing to remember is that every motion you make, in your tramps, in your muscle exercises, in your daily work, you should try to make with a will. Our work and play is a part of the work and play of the world. The earth swings around the sun, the tides rise and fall, the sap flows in the trees, the animals work and play. Let's prove that we too are alive by not crawl-

ing and humping and shuffling through the world, but moving along swiftly and strongly.

THE MEANING OF MOTION

Think about the people of other times, whose history you have studied. Try making lists of the games and exercises they had for enjoyment and the development of strength. How many of these are like games *we* play?

Find out what events took place in the Olympic games of the Greeks. Can you find pictures showing any of these? Which of these events are included in our school and college track-meets? What powers must a boy or girl have to succeed in any of these?

Can you find and tell any true stories where a hero or heroine was able to do a great deed because of being in fine physical condition.

Examine some raw meat, to be sure you know how muscle looks. Why is it so pink? Find out how muscles are attached firmly to bones. Examine. your biceps muscle in action and find out how it behaves in producing movements. When you want to increase the size of these muscles, what do you do? Can you tell why? How many times can you "chin" yourself?

Count your pulse while standing still, and ask someone else to count your breathing, for a minute. Now run briskly for three minutes. Take the same counts. Note also your temperature, and the color and feeling of your skin. What do these experiments tell you about the effects on heart, lungs and skin of working your muscles? What are the health benefits that come from these effects?

Suppose you have finished school and gone to work, with hours from 8:30 to 5:30. What ways are there for you to have enough recreation and exercise? List them in the order of their value. If you like, try a debate about the values of the various exercises chosen by your classmates.

If exercise is to produce the best health results when, where and how shall it be taken? When you have decided upon these points, make a list of exercises a city working girl or boy could take to meet the requirements.

Do you know anyone who has the habit of exercise and fresh air? Does it seem a good habit? How was it formed?

Form a habit of at least one hour's exercise outdoors daily. How will you keep yourself reminded?

FOOD

The second way in which live things differ from dead ones is that live things renew and repair *themselves.* If a knife blade is broken, a new blade must be bought, but if a person's arm is broken, the pieces of bone will grow together again. If you fall into the water and get your watch water-soaked, its delicate machinery will rust, and you may perhaps take cold. But the watch will never rid *itself* of the rust—it must go to the jeweler—while you will soon "shake off" your cold.

And as plants and animals repair injuries done to them, so also they can renew themselves. You have often seen a knife blade that is worn thin by long use. We have all seen men and women who have grown thin from working too long and too hard. When a knife blade is worn thin, there is nothing to do but use it until it snaps and then throw it away. But if we find that we are growing thin, too thin, what do we do? We eat more, sleep more, try to work a little more easily. In these ways, we shall probably before long regain the flesh we lost.

While we are little children, most of us eat whatever our parents buy, but you boys and girls who are soon going to be a part of the business world need to know something about food, for what you eat will make a great difference in how well you work. On the other hand, the sort of work you do will make a difference in what food you need and in the amount you should eat. There

is a good deal of truth in the old saying, "Tell me what you eat and I'll tell you what you are."

Now just what does food do for our bodies? It does two chief things. In the first place, it "keeps our fire burning," so that we have strength to work and play, so that our hearts will keep on pumping, just as the fire in an engine keeps the rods and pistons moving, so that the wheels will turn and the engine move.

In the second place, food supplies material so that our bodies will not wear out, and even, in the case of children and young people, so that they will grow. Food is to our bodies somewhat as oil is to a lamp. When the oil is all burned, *the wick itself* will burn awhile and finally the last spark will die out. So, if we go without food, for awhile our life-fire will feed on our bodies, and we grow thinner and thinner, until at last we die—the fire goes out.

Now what food is best for building material and for supplying us with warmth and energy? Let us examine some of Mother Nature's foods. How does she feed the baby plant, the baby bird, the baby animal?

If you look closely at a split dried bean, you will see the tiny plant in the center, with one half of the bean on each side of it, like a sort of saddle-bag. These saddle-bags are the food stores on which the baby plant lives, and if the bean is planted, as the seedlet grows into a plant, its food-bags shrink and wither away, for all the food in them has been used by the growing plant. It has used up a good deal of building material and a great deal of energy in pushing its way up through the earth.

So we place the dried bean among the foods that help our bodies to grow and to work.

The baby bird, while in the egg, is kept warm by his mother's feathers and he is not stirring about much, so he needs little energy. But he has to do a great deal of growing and needs a lot of building material to form his bones and muscles and feathers. The egg is his food store, and eggs are one of our best body-building foods. But they do not give us much warmth and energy—we call them for that reason, a "light" food.

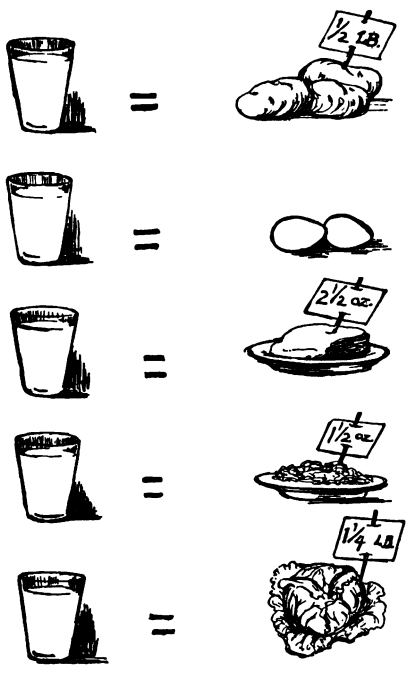
The baby animal is fed on milk, which has often been called the "ideal food," because it provides plenty of material to build the body and lots of warmth and energy. There is no other food that will take its place for babies and children, and it is one of the very best foods for grown people.

I do not think that it is necessary for us all to study the whole science of foods, nor to learn the names, even, that scientists give to different sorts of foods. Scientists call the *building* foods "proteins" and the *warmth-and-energy-giving* foods "carbohydrates" and fats. It makes no great difference whether you remember the scientific names, so long as you understand what foods you yourself need.

If you are still young and need to grow, you must have a certain amount of building food, and the very best building food is milk. Dried beans and peas are good, and so are eggs and fish and cheese. Meat is a building food, but most people are inclined to eat too much of it,

which is hard on the stomach and the kidneys. It is wiser to drink plenty of milk and to eat very little meat. A great many people do without meat entirely and are perfectly well.

The heat-and-energy-giving foods include all the fats, such as butter, oil, cream, fat meat, etc., and all the foods that are largely made of starch and sugar, such as potatoes, rice, bread, oatmeal, cornmeal, sugar, cakes and sweets.



I once knew a girl about twelve years old who went away from home to a boarding school. When she arrived, she looked so pale and thin and had such dark circles under her eyes that her teachers wondered what could be wrong with her. But on the very first day, they found out. At breakfast, Margaret would not eat anything but some fried potatoes and bread and butter. She would have liked coffee, but she did not care for milk or for the cereal and fruit that the others were enjoying. At dinner, she ate two helpings of potatoes and two of pudding, but she did not like fish, or soup or green peas. At supper, she begged for tea but refused milk and ate only

BALANCE YOUR MEALS

EAT SOMETHING FROM EACH GROUP

CEREALS – bread, macaroni, rice, oatmeal and other breakfast foods.

FATS – butter, cream, olive or other oil, meat fat.

VEGETABLES and FRUITS – at least one of each everyday.

PROTEIN FOODS – meat, eggs, cheese, fish, dried beans and peas.

LET MILK BE THE BALANCE WHEEL

USE SWEETS SPARINGLY

some bread and jam. The housekeeper who arranged the meals found that Margaret ate practically nothing but bread, potatoes and sweets. I decided to have a talk with Margaret, for she was a bright girl and I felt sure she wanted to be well and strong. So I explained to her that she could never grow if she ate so little food and only one kind of food, and that if she made a little effort, she could soon teach herself to like pretty much all kinds of eatables.

She promised to try and inside of a month she proudly told me that she liked everything on the table. I don't think I ever saw a greater change in anyone. She fattened up, her cheeks grew rosy, the dark circles under her eyes disappeared and there was not a healthier, happier child in the school—all because her body was getting plenty of the right kinds of food instead of being starved on a little of *one* kind.

Besides foods that give building material and heat and energy, the body needs about two quarts of water a day, some minerals and certain materials called vitamines.

You can very readily see why our bodies need water, for all living things are largely made up of water. The warm breath from our lungs is full of water, as you can prove by breathing on a cold mirror. And of course the body loses a good deal of water through the skin in perspiration and through the kidneys. To make up for this loss, we must drink a great deal of water. My rule is a glass first thing in the morning and last thing at night, a glass at each meal and one or more in the middle of the morning and middle of the afternoon. There is no harm in drinking at meals—quite the opposite—but very

cold water is not wholesome and we should not use water to wash down lumps of half-chewed food.

As for our needing some mineral in our food, perhaps the idea seems strange to you, but salt is a mineral and you know that tears and perspiration both are salty—so it is clear that our bodies need salt. There are other minerals in the body, such as lime in our bones, and iron in our blood. These minerals are found in milk, eggs, fruits and vegetables. That is one reason why lettuce, spinach and other green vegetables, although they do not give us much fuel or energy, are needed to keep our bodies in good running order.

Besides the body-building proteins the warming, energizing fats, sugars and starches, the necessary water and minerals, there are certain substances about which little is known. They are called "vitamines" and are found in fresh milk, butter, cereals, eggs, carrots, fresh fruit, potatoes and meat. Just what vitamines are nobody has yet found out, but we know that without them in our food we cannot keep our health.

And now what has all this to do with your daily plans for keeping well? It means, first, and foremost, that you cannot do good work on a breakfast of coffee and toast, a lunch of tea and cake and a dinner of meat, potatoes and cornstarch pudding. Such a diet gives you hardly anything but starch. On the other hand, I know boys and men who have ham and eggs for breakfast, sausages for luncheon and two large helpings of meat for dinner. Such a diet gives entirely too much building material, and too little starch.

Of course, your diet must depend on your work. If you are chopping wood, hammering steel or doing some-

thing else that needs a great deal of muscle-work, you will want to keep a roaring fire under your boiler. But

Courtesy of U. S. Dept. of Agriculture

if you sit at a table using your brain or doing some "light" work, you will want a much lighter diet.

But in any case, start off with a good breakfast, of

fruit, cereal, milk, toast, and, if you wish them, eggs. Cof-

fee and tea contain no food whatever, except the milk and sugar that you put into them. They "set you up" for a time so that you do not feel the need of so much *real* food as you would otherwise eat, and they often upset the nerves and stomach. The habit of tea and coffee drinking is easily formed and hard to break. It is a pity that so many young people should form it.

As for luncheon, stores and factories often provide a hot lunch at cost for their employees, which is a good rule, since it "works both ways," improving the workers' health and also their work. Some workers carry thermos bottles of hot soup or cocoa. This, with some nice sandwiches, a bit of fruit, and cake or cookies, makes an inviting luncheon and one that will keep you feeling "fit" until dinner time.

I often eat my luncheon in a little restaurant where I see a good many girls who work in a factory nearby. Almost all of them are eating cakes, eclairs, tarts, pie or some other sweet stuff and drinking either coffee or tea. I remember once seeing a girl—such a pretty girl with naturally rosy cheeks and bright eyes—who had bought a glass of milk, a dish of spaghetti and some fruit. I was so surprised that I suppose it showed in my face, for she smiled and said, "I used to have coffee and an eclair, and then buy a bag of chocolates to eat during the afternoon, but I found I just couldn't work and was nervous and worn out. And one day, out in front of this restaurant, I saw a team of big, fine horses, strong as oxen, eating their lunch. When they had finished their oats, the teamster gave them each an apple and they

seemed so strong and ready for work that I envied them. Then I got to thinking about what I had been taught in school about eating and I decided I was a goose to think that I could work without any decent food. And ever since then, I eat a good, filling, sensible lunch. I work hard all day, walk most of the way home and have a rousing appetite for dinner. No more eclair and candy lunches for me!"

FOOD

To get the real meaning of this chapter, we want to hold clearly in mind the differences between our living body's tools and inanimate tools and machines. What are these two differences?

If someone offered to show you some wonderful magic which could change carrots, milk, and wheat into a boy playing football, would you believe it? After reading this chapter, could you think of a true explanation of such magic?

How could you find out from Nature what foods to eat, to give you heat and energy? Name such foods. Tell your school-mates how you knew these were energy foods.

Where will you find the foods nature provides for the building materials of growing animals? What proof have you that these *are* building foods? At what ages do people and animals need the most of such foods?

Why must all things have water? How much do *you* need? Watch yourself for a few days and state on how many days you drink enough water. Are there any dangers in drinking water? If you think so, tell how they can be avoided.

Coarse, rough foods may not be digested but they are very necessary. What are such foods and why are they good for us?

How do you suppose the little bones in babies' legs and arms ever become as big, hard and strong as yours?

What would you give the babies to eat or drink to help bones become strong, and why?

What foods should growing creatures eat, to give them the minerals their bodies need? Where do you suppose such foods get these minerals?

You may have heard of the children in Europe, and in some parts of our own country, who are pale, thin, and do not grow. Their food is mainly bread, soup, potato—sometimes a little meat or syrup. Even if they had plenty of these things they could not keep their health. What are the magic foods they need to help keep their bodies healthy?

Plan some breakfasts, lunches and dinners which will give you energy, building materials and help keep you healthy. Why should a boy be able to plan such meals as well as a girl?

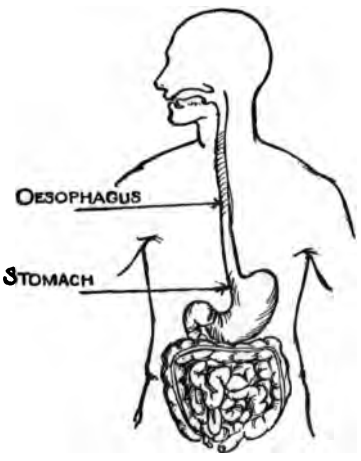
Does it make any difference in a worker's output if he has a right or wrong food? In a little child's growth? In a boy's or a girl's school standing? Try to convince someone who disagrees with you that you are right.

Why do we say "Food makes the man?" Find some example in geography or history to prove it. Find some example in your school that proves this.

THE TOOLS WITH WHICH WE EAT

Now how do our bodies perform the miracle of turning meat and potatoes, vegetables and fruit into muscle, bone, blood and tissue?

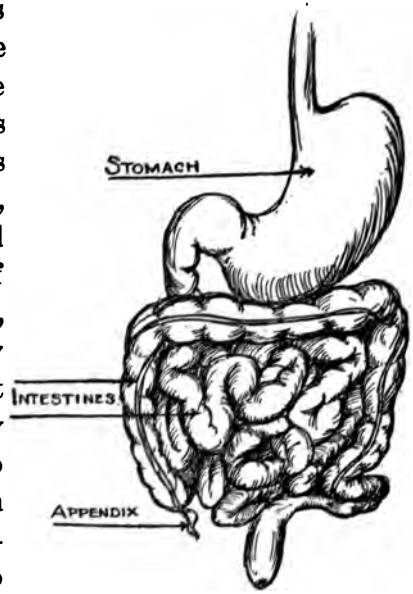
You will say, very promptly, by digestion. But what *is* digestion? The word digestion means, really, *taking apart.* Long before you put a piece of potato into your mouth, this process of taking apart, separating the useful part from the useless, has begun. When the potato is dug from the ground, the tops are thrown aside and only the potato is sent to market. Next the peel is removed, either by the cook, or by yourself. Then the taking apart process is continued by your knife and fork, cutting the potato into proper mouthfuls. Next come the teeth, grinding and cutting, while the saliva softens the potato into a smooth, half-liquid mass.



If you examine the illustration, you will see how the softened food slips down your throat into a tube called the esophagus, leading into your stomach. The stomach is much like a pear-shaped rubber bag, which stretches or shrinks according to whether it is full or empty. It is

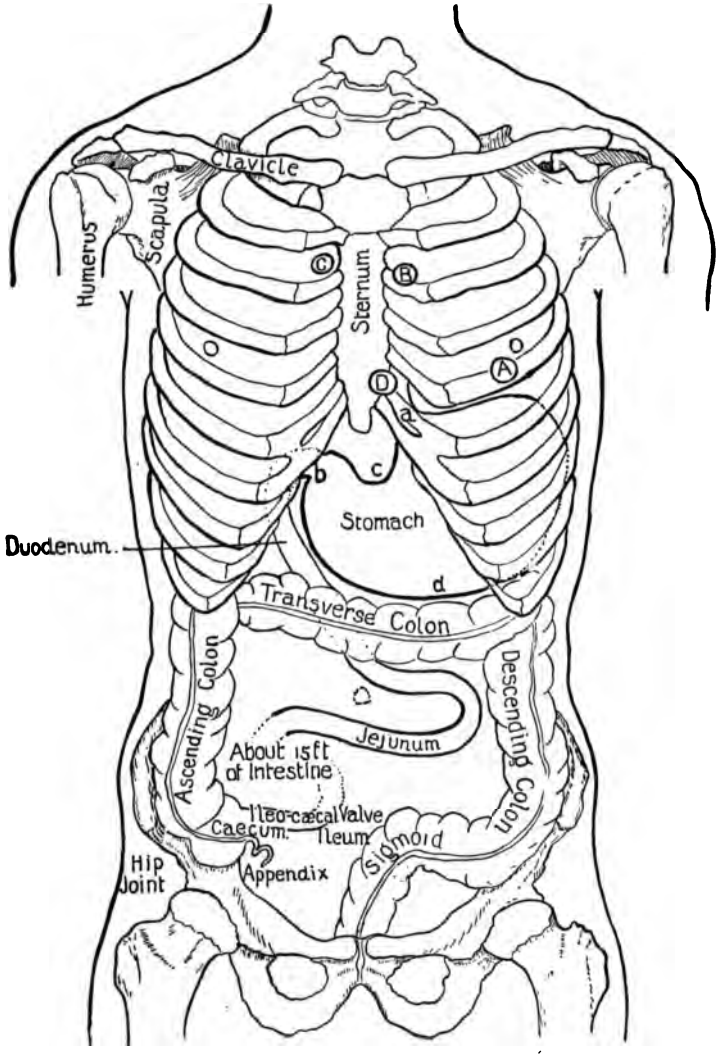
lined with a very thin skin or membrane, which gives out a sort of juice (the gastric juice), just as your outer skin gives out sweat.

If you have ever seen a washing machine at work, you have a pretty fair idea of the way your stomach works. The washing machine rocks back and forth, so that the water swashes vigorously through the clothes and drives out the dirt. The stomach does not actually rock, but its walls squeeze in and out, so that the juice is mixed all through every bit of food. This juice is acid, and you doubtless know that acids have a great softening effect. So, by the time that the potato passes out of the stomach into the intestine, or bowels, it is a liquid, with no lumps, about like a thick soup.



The intestine is a tube, about twenty feet long, which also mixes a fluid with the food. Along this tube, the food is moved by a series of *pinchings together* of the walls, just as a pastry cook forces more and more icing out of the pastry tube, by squeezing the bag. And as the food moves along, it is now so softened and all its particles so separated, and so changed by the acid juice of the stomach and by the intestinal juice, that it can pass

through the tiny blood-vessels in the walls of the intestines and so right into the blood-stream. The blood



carries it all over the body, feeding muscles, bones, and all the organs, just as sap carries food to plant cells.

As you see, the whole process of digestion is a process of *separating* the food, the useful parts going into the blood and the waste parts passing out of the body. Getting rid of these wastes is one of the most important things that a worker needs to remember. Constipation causes more headaches, tired feelings, colds, and general troubles than almost any other one thing. Constipation means that the decaying wastes are left in your body so long that they pass into the blood and poison the body. You do not eat wastes such as tomato vines, at the *beginning* of the digestive process. And yet this is just as sensible as, when the digestive process is over, not getting rid of its waste.

There are four chief ways of fighting a tendency to constipation. The first is to have a regular hour, preferably right after breakfast.

The second is to take as much exercise as possible.

The third is to drink plenty of water.

The fourth is to eat plenty of fruit, green vegetables, and coarse food, such as whole wheat bread, oatmeal, etc.

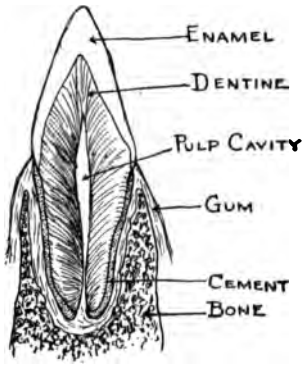
You cannot expect your body to run well when it is clogged with stale waste matter, any more than you can expect an automobile to run well when it is all clogged with carbon.

We cannot control the action of our stomachs or intestines, but we can choose our food and we can chew it. We have already talked about choosing food wisely. Now how about chewing?

Since digestion means *separation,* you can easily see

how important it is that we should have good tools with which to do the separating. The work of the stomach and intestine is made much harder if the teeth are not in condition to do their part in preparing the food.

If you look at the picture, you will see that the upper part, or crown of the tooth, which is the only part that shows above the gum, is covered with a hard white enamel. This enamel is much harder than bone and is meant to protect the soft inside of the tooth. If it is cracked by our using our teeth as nut crackers, the softer parts of the tooth inside, will suffer. Don't abuse your tools by making them do things for which they were never intended. It is as silly to crack nuts with your teeth as to whittle sticks with a razor—sillier, because you can buy a new razor, but not a new, *real* set of teeth.



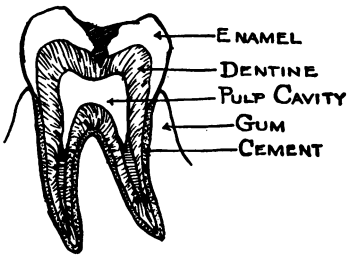
Inside the enamel is a bony material called *dentine* and inside the dentine is the pulp, with the blood vessels and nerves running up into it through a tiny hole in the tip of the root.

So long as the enamel is not broken or worn away, the tooth will ordinarily be all right. Some people however, break the enamel by rough usage, and a great many more people allow it to be eaten away by their careless—really dirty—habits.

I suppose you have often seen a silver spoon blackened and spoiled for lack of cleaning. Much the same

thing happens to uncleaned teeth. If bits of food are left between the teeth, they start to decay. The decay forms acids—you know that we talk of food as "souring" —and the acid eats through the enamel, eats still more quickly through the dentine, attacks the pulp, and then the tooth nerve begins to "jump" and ache.

Decayed teeth mean half-chewed food, for it is not easy to chew with sensitive, aching teeth.



They mean bad breath, indigestion, and a most unattractive mouth.

They also may mean suffering from various troubles in many parts of the body. If an abscess forms at the root of a tooth, the poisonous pus gets into the blood and is carried all over the body. I remember several years ago having a great deal of pain in my knees. Every time I knelt, they gave a fearful twinge. I should never have thought of my teeth as the root of the trouble, but my dentist took an X-ray of my mouth and at the root of a back tooth, there was an abscess. I had the tooth pulled and my knees gave me no further trouble.

And now how are we to keep our teeth clean?

A great many people who think they are perfectly cleanly content themselves with giving their front teeth a hasty rub when they wash in the morning. This always reminds me of a girl I used to know who put on a pair of clean gloves, because she didn't have time to wash her hands. The fact is that our front teeth are not

really anything like so important as our back ones. The front teeth are meant for cutting and biting. Biting is important to savages, who tear their meat from the bone

with the teeth, but we do not bite most of our food, instead we cut it with a knife and place it in our mouths with a fork or spoon.

But the back teeth are meant for crushing and grinding the food so as to separate it and get it ready for

the stomach and intestine. It is a terrible loss to be deprived of one's back teeth.

The teeth need brushing *whenever they have been used*—that is after every meal, so that no bits of food may be left to decay. You would not eat with soiled spoons and forks. Why should you eat with soiled teeth?

They should also be cleaned before breakfast, in order to get rid of any acid, unpleasant taste, and the last thing before going to bed, so that they shall be perfectly clean and have no chance for harboring sour food during the night.

Having settled the question of *when* to brush, the question remains of *how* to brush. Choose a brush that is neither soft nor hard, but, like the little bear's porridge, "just right." Dip the brush into salted water or some simple tooth-powder and brush *all* the teeth, front and back ones, and on the *inner* side, as well as the outer.

Do not *scrub,* for fear of breaking the thin skin of the gums, and do not brush *across* the teeth. The ridges in the teeth run up and down, and to get the brush into these tiny ridges, brush the teeth *up and down.*

After meals, clear the spaces between the teeth from any bits of food, by using a piece of dental floss, or a rubber band.

Close to the gums (especially on the inside of the front lower teeth) one often finds a line of yellow, or orange. This is tartar, a hard substance that you can partly, but not always entirely, prevent by cleaning. Twice a year, you should go to the dentist to have your teeth examined for any trouble, and it is wise to have

the dentist remove this tartar with his instruments. Otherwise the tartar is likely to loosen your teeth.

Lastly, don't try to clean your teeth with a dirty brush. Be sure to wash the brush after using it and keep it in an airy place, where it will dry quickly. It is a good thing once in awhile to dip the brush into boric acid, strong salt water, or let it lie all day in the sun, to kill any germs that may lurk in it.

Good teeth are attractive. I've heard of a boy's losing an opportunity for a good job, just because he had black, unsightly teeth.

Good teeth are the first step in good digestion and are necessary to good health.

And since a good appearance and good health are both needed to get and hold a good position, no worker can *afford* poor teeth.

THE TOOLS WITH WHICH WE EAT

When you hear people talk about digestion, what do they mean? What really is digestion?

What work does the stomach do for us in digestion? Tell how it does this work.

Where does the bread, egg, and milk which you may have had for breakfast, go after it leaves the stomach? What does it find awaiting it there to complete the work of digestion?

When digestion has been finished, what becomes of the digested part? What should become of the undigested part?

Think how an automobile would work if carbon were never removed from the engine? A furnace, if ashes were never removed? What resemblance is there between these things and our bodies if the undigested wastes are not removed?

What are the evils that come to the body through constipation?

How can an intelligent person control his daily living habits, so as to avoid constipation entirely?

Can we call our teeth our first aids in getting our food digested?

Take a mirror and find in your own mouth all the parts of a tooth described in this chapter. Which part did you see? *Not* see? Why not?

What is the value of the shining enamel covering our teeth? From what dangers should we protect it?

Do you know what acids are? If not, perhaps your teacher will give you some litmus paper and show you how to recognize them. Have you noticed any foods *not* acid become so? Tell about it. Now can you tell why food lodged between the teeth, may form acids and hurt the teeth? Do you think the acid juices of fruits, quickly swallowed, *do* hurt the teeth?

How do the acids of decay harm the teeth?

What are the evil results of decayed teeth?

Will it hurt to let your baby teeth decay, even though you will get permanent ones later? How will you make this clear to your little brothers and sisters?

What is your plan for cleaning your teeth? What tools do you use? How often? How do you keep your brush sweet and clean? What help must you get from the dentist in keeping your teeth in good condition?

Write a list of reasons why it will pay a boy or girl who wants to get a job, to have a set of sound and shining teeth.

CARE OF THE SKIN

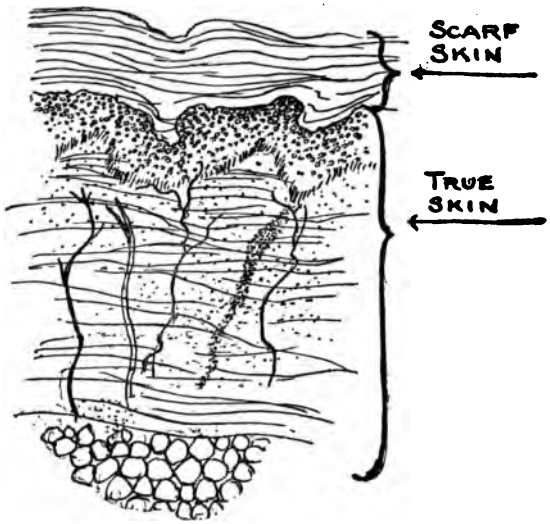
EVERY machine or tool that is exposed to the weather must be protected by some sort of coating. Wood decays and iron and steel rust, if they are allowed to remain unprotected. We paint our wooden and iron fences, and the hulls of our ships. We paint our ambulances and tanks.

Nature does the same thing. Every plant or animal is carefully protected by a waterproof jacket. I detest the fuzzy feel of a peach skin, but without it, I fear I could never have a chance to enjoy eating another peach. At every rain storm, the water would soak into the peach, making it decay and ruining its flavor. There are a number of leaves from which you can peel the skin, as fine and delicate as a cobweb. The tree-trunk is protected by its thick bark. All the animals are protected, in the same way, by a coat of skin, which keeps out water and dirt, and also keeps the water *in*. As I said before, the body is largely made up of water, just as plants, fruits and animals are. You know that a peeled peach or a piece of raw meat will soon "dry out," because the water (or, as we say, "juice") evaporates. If we were "skinned," we should dry up, also.

As we all know, the skin varies on different parts of our bodies. On the soles of the feet, it is thick and tough. On the roof of the mouth it is extremely thin and tender. On some parts of the body, it is very loose and elsewhere it is tightly stretched. On the scalp and the ears, it lies

right over the bone or gristle, while on most of the body it lies over the muscles.

If you look at a cut piece of skin under the microscope —what scientists call a cross section of skin— you will see that it is not "all of a piece," but is made up of two layers. The top layer, or scarf skin, is very thin.



When the skin is blistered, this outer skin may be easily peeled off. It has no nerves nor blood vessels, so that a needle can be run under it without its hurting or bleeding. Under a powerful microscope, you can see that this scarf skin is made of layers of tiny scales. It is these scales, rubbing off, that often line your stockings with a white powder. Under the dry, outer scales, are softer ones that are always growing and crowding upward to take the place of the old scales that you have rubbed off with a towel, or with your clothing.

Under the scarf skin, lies the true skin. If you cut through the outer skin into this real skin, it bleeds and smarts, for it is full of blood vessels and of nerves with which we tell whether things are hot or cold, hard or soft, smooth or rough. These nerves are especially sensitive on our finger tips. It is much easier to "feel" with your finger tips than with other parts of the body.

The skin is well supplied with oil glands, for oil is needed to keep it soft and limber—you know what happens to an oil-skin when it gets old and dry. Oil is also needed to make the skin waterproof. We talk sometimes about being "soaked," but the water never goes farther into our skin than just enough to soften the top layers of loose scales. It never really gets into the skin at all. Our skin oil acts like the oil in paint which protects outdoor machinery.

Besides the oil, our skin also gives out perspiration, through the tiny holes called "pores" which, to the number of more than three million, are dotted all over our bodies. Usually we do not notice that we are perspiring unless there is so much that it runs down in drops, but really we are perspiring all the time. Wipe your finger tips as dry as you can get them, then press them against a clean mirror, or polished metal. You can see the print of every finger made on the mirror by your oily and

perspiring skin. It is by these almost invisible finger prints that criminals are often discovered.

The perspiration is mostly water, with quite a large amount of waste matter from the body. In addition to carrying off this waste, the perspiration helps to cool the body, as it evaporates. People who perspire very little in hot weather usually feel much more uncomfortable than those who are drenched in perspiration. You can readily understand this, if you wet your finger and then dry it by blowing on it. You will find that it feels much cooler than if you blow on a dry finger.

Besides cooling our bodies by perspiration in summer, our skins help to keep them warm in winter, because the tiny blood vessels in the true skin draw together and become smaller. In this way, they allow less blood to get near the surface where it can be chilled by the cold air.

Now, since our skins help us to be warmer in winter and cooler in summer, beside being a protecting covering, and enabling us to "feel" things, you can see how valuable they are. What shall we do to keep them in good working order?

The one, great thing that we can do, is to keep the skin clean. The prettiest face in the world is not attractive if the skin is dirty, and even a plain face has a certain charm if the complexion is clear and smooth. A sallow, muddy skin is sometimes due to indigestion, caused by eating too much pastry and sweets, or to constipation, due to lack of exercise and too little fruit and coarse food, or to general ill health, caused by bad air. That is why the doctor said "Paint your cheeks from the inside," meaning that good health is the only thing that

will make a good complexion. Very often a bad complexion is due to nothing more nor less than lack of bathing.

Most people wash their face and hands when they get up in the morning, and a good many wash them when they go to bed. I should like to know just how many wash all over every day. Nowhere near everyone—and yet the rest of the body needs bathing even more than the face does, and since the perspiration, laden with waste, pours out all day long and every day, why should we think that it needs to be washed away only once a week or so? We wash our dishes every day. We would not eat from soiled plates—why should we live in soiled bodies?

There are almost as many different sorts of baths and ways of bathing as there are sorts of people, and each one must decide what is best for his own needs. The Japanese bathe in water as hot as they can stand it, and they are among the cleanest and healthiest people in the world. Some people like a tepid bath, neither hot nor cold. I remember seeing a little Hungarian baby—the son of a nobleman—who was dipped every morning into a tub with a big cake of ice in it!

"The proof of the pudding is in the eating" and the proof of a healthful bath is how it makes you feel afterward. If a cold bath makes you feel shivery and uncomfortable for some time afterward, it evidently does not agree with you. If a hot bath at night keeps you awake—as it does with some few people—then you cannot follow the usual rule of cold baths in the morning and warm baths at night.

Hot or warm baths are needed to give the skin a thorough cleansing, while cold or cool baths, though less cleansing, brace one up and "harden" one so that he is less liable to take cold.

If you are in good health, a cool shower, or plunge, or even a rub with a towel wet in cold water, will freshen you up wonderfully and make you feel ready for the day's work.

When I was younger, I used to plunge every morning into a tub of cold water. I never learned not to shriek when I struck the water, but afterward I felt fine. As I grew older, however, I found that this cold plunge did not agree so well with me. Nowadays, after a good soaping, I stand under a shower of very warm water and turn on the cold water gradually, until the shower is quite cool. This cleans the skin thoroughly, leaves me feeling fine and does not disturb the neighbors by making me scream!

But if you are one of the fortunate ones who can take a cold bath every morning, you should provide for cleansing your skin by taking a warm soapy bath at least twice a week, for the oil from the skin makes a greasy film that is not washed away by cold water.

Another excellent way to train your skin so that you will not take cold easily is by taking an air bath in the morning. You can do this by doing your morning exercises after your bath and before you put on your clothes. This exposure to light and air is so good for the health that children who have tuberculosis are often sent to sanitariums, where they run about outdoors with almost no clothing.

Is is especially important for us all to form habits of cleanliness, for we never know how really *dangerous* unclean habits may become. In many work rooms and factories, the workers have to handle arsenic, lead and

other poisons. Many, many such workers have died or lost their health simply because they had never formed the habit of always washing hands and face before eating.

The habit of keeping clean is important for us all, but for some of us, it is going to mean the difference between life and death.

CARE OF THE SKIN

Go outdoors and list everything you see which is varnished, painted or whitewashed. Come inside the house and do likewise. Why this treatment? (If you cannot answer this question, perhaps the science teacher in your school will help you.)

Let a peeled and an unpeeled apple lie in the window for a week and decide upon the use of the skin. Does your body need protection for any of these reasons?

Why is it that your skin is of different thickness, and stretched to different degrees of tightness, while the skin of the apple or potato is pretty even?

What can you tell about the way your skin is made, and how it is nourished so that it can grow?

Make a list of the facts you can discover about something or other by running the tips of your fingers over it with eyes closed. Explain why you can do this. How useful a power is this?

What prevents the cracking and drying up of your skin? Why are pure cold creams sometimes useful in winter? Find out the proper way to use cold cream.

Try to plan some experiment to show that water evaporated from a surface, cools that surface. Show why we must perspire in summer to be comfortable.

What would happen if the mouths of the oil glands and pores were closed up. How could they *get* closed? How may we keep them open?

What are advantages of cold baths? Of warm, soapy ones? How will you determine what kinds of baths are best for you?

Make a program for keeping the skin surface clean, rosy and soft. Explain each step and the use of all the articles you wish to use. Try this program on yourself for a month and criticize its results.

Is cleanliness ever a *safety* measure? Just why?

Collect some advertisements of various soaps, creams. From your study, what good results do you expect from soaps? What are the requirements for a good soap? Do you think "fancy" soaps are necessary for

these? Explain your opinion. Ask a druggist what goes into a pure cold cream? What could such a cream do for your skin? Do you think fancy and expensive ones can do more?

If you cover pores with "lotions" or pastes, or powders, what will be the probable effects? Is this a cleanly habit?

Write what you think is the most certain prescription for a good complexion. Try it for as long as you can, or until you get results from it.

What is the business and social value of a naturally fine complexion?

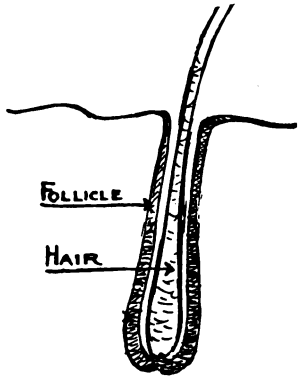
CARE OF HAIR

WHILE the skin is a great protection to the body, the most sensitive parts of our bodies are still further guarded. The entrance to ears and nose is guarded by fine hairs, to keep dust and insects out. Our eyelids are fringed with hairs and further protected with eyebrows, to catch dust, grit and perspiration that might otherwise get into our eyes. The most sensitive part of all, our brain, is protected not only by the thick bone of the skull, but by a mat of hair. The hair warms the head in winter, guards it from the direct rays of the sun in summer and protects it from injury by accident or attack.

I had a friend who lost almost all her hair from typhoid fever, and had to have her head shaved. It made her head so cold that she wore a little cap. We scarcely realize how much protection the hair gives until we lose it. My sister was once thrown violently from her bicycle and struck the back of her head. The blow made her unconscious and the doctor said would have fractured her skull if it had not been for her knot of unusually heavy hair.

Like our other body-tools, we are apt to take our hair as a matter of course, not realizing its value and giving it very little care. Perhaps this is partly because we have never thought or known very much about hair and the part it has always played in human life. And yet abundant hair has always been a mark of beauty and strength. Ever since the days when the prophet Elisha's bald head was jeered at by the street urchins of Palestine, baldness has been unpopular.

The Indian's scalp lock and the Chinaman's queue are marks of dignity and all history is full of long-haired heroes, from the days of Samson down. I have read that when an Arab wishes to deny anything very strongly, he will say, "If I have done it, then may the Lord turn my locks into a bald head!"



So much in love were our ancestors with the idea of having a decorative head of hair, that wigs were very fashionable, even among those who had plenty of hair of their own. In the British Museum is the wig of a mummy over three thousand years old. Queen Elizabeth is said to have had eighty different wigs and in our own New England the famous preacher, Increase Mather, preached against the wearing of wigs, calling them "horrid bushes of vanity."

Nowadays, it is considered a misfortune to wear a wig. How, then, shall we keep our hair in good condition?

The hair is really very like the skin in its structure. It has an inner pith, then a fibrous part, and outside of all a series of overlapping scales and it is oiled just as the skin is.

It grows in a little pit in the skin called a follicle—which means a "little bag,"—and we have from twenty thousand to one hundred and fifty thousand of these hair follicles, according to whether we have little or much hair.

Like the skin, of which it is really a part, the hair

needs proper nourishment and cleanliness. By nourishment, I mean that unless our general health is good, the

hair is likely to be thin and dry. If you compare a gutter cat with a pet one, you will see how coarse, dry and poor

the tramp's fur is, and how thick, glossy and fine is the fur of the pet. The same thing is true of our hair. If we are not well, the blood supply which feeds the hair is poor and the hair suffers or falls out.

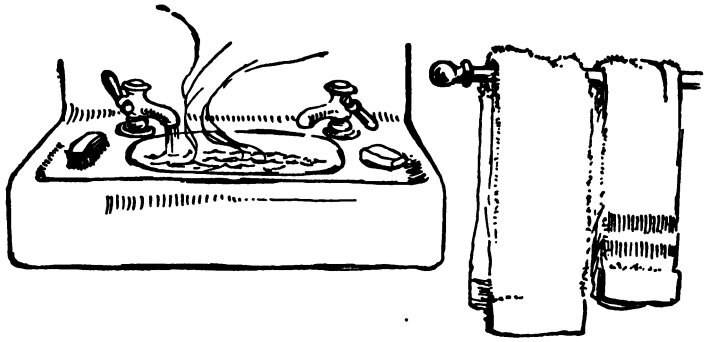
As to cleaning the hair and scalp, the hair should be brushed well, night and morning, to free it from dust and to brush out the mixture of oil and skin-scales that we call dandruff. Brushing also brings the blood to the scalp and so keeps it healthy.

How often you should wash your hair depends entirely on how dirty it gets. Some hair is naturally very much more oily than others. Such hair catches and holds dust much more readily than fluffy, dry hair, and therefore needs more washing. A boy who has oily hair should wash it every day. A girl can scarcely do that, but she may wash it every week or two.

Another point to consider is whether you live or work in a very dusty place. If so, your hair will need frequent shampooing. Each one must make her own rule, but don't be afraid of washing your hair too often. Hair is much more likely to be spoiled by not being washed enough.

All that is necessary to give your head a good shampoo at home is *plenty* of warm water, good, pure soap, and soft towels, with a nail brush, if possible. The soap should not be rubbed on the hair, but made into a lather with the hands or brush and then scrubbed into the scalp. Keep on washing the hair until the soapy water squeezes out of it perfectly clean. Then rinse it in plenty of warm water and keep on rinsing until the water shows no trace of soapiness. Then pour a little cold water on,

to close the pores and keep you from catching cold. Finally rub as dry as you can with soft towels and finish drying in the sun or over a radiator. Don't ever dry hair over a flame or before an open fire, as it is very likely to catch fire and burns instantly. After washing, brush the hair well.



Before washing your hair, always be sure that your brush and comb are perfectly clean, so that you shall not comb clean hair with dirty tools. The best way is to dip the comb and bristles (not back) of the brush into hot water containing a little ammonia. This dissolves the greasy dirt and the brush will quickly dry in the sunshine.

It should not be necessary to warn anyone against trying on other people's hats, or laying his or her own hat in any dirty place. Such habits may result in your catching your neighbor's scalp disease, or in your head becoming infested with vermin.

If you are so unlucky as to become infested in this way, the best cure is tincture of larkspur, which can be bought of any druggist. Wet the scalp well with this at night

and tie the head up in a towel. Keep this up until there is no sign of the trouble left. If there are nits—tiny white eggs fastened to the hairs—they can be dissolved off by washing the hair in hot vinegar. But remember that larkspur is *poison* and must never be left on your fingers or allowed to stand where anyone, especially children and pets, can get at it.

Another valuable tool that is really only a form of altered skin, is the finger-nails. In the nails, the scales of the skin have thickened and become horny.

I suppose that our savage ancestors found nails useful as a fighting weapon, but with us, they serve to protect the finger-ends and are also most useful in picking up and handling small objects. We do not generally think of them as a special ornament—at least we do not let them grow to enormous lengths and protect them with golden and jeweled shields, as the Chinese do.

And yet shapely, well cared for nails are a real ornament and without them no hand looks attractive. In

fact, a set of dirty nails is a sign that its owner is slovenly and unrefined. No worker can afford to carry such a "don't hire me" sign.

All that is necessary to have good nails is to scrub them whenever you wash your hands, with a nail scrub, warm water and soap, and then clean them with an orange-wood stick or small wooden tooth pick. The nails should be trimmed often, for it looks better and they are much more easily cleaned.

The flesh around the base of the nails should be gently pushed back, after washing the hands and while the damp skin is soft. If this is neglected, the skin is likely to tear and form "hang-nails," which are painful and are also good places for dirt and germs to enter.

Boys and girls do not realize that the average employer looks not at the new dress or the stylish overcoat, but at the hair and nails, when he is picking out an employee. The girl whose hair is frowsy, or done in an extreme style, and the boy whose nails are "in mourning" may never know *why* they were not chosen, but the chances are against them, all the same.

HAIR

Before you can care for your hair intelligently, you must, of course, understand it. Put into simple, exact, statements, the facts about what a hair is, and how it grows. Use your facts to explain the following:—

How does the hair get oily again, after it has been washed?

Where does hair get the food it needs to grow? From which end does it grow? Why doesn't it hurt to cut hair?

Why does every "hair-tonic" require you to rub it in? What keeps your hair—the "tonic" or the rub?

What is dandruff? Why is it relieved by daily brushing and enough shampooing?

Shampoo your hair yourself according to the directions in the text.

Make a brief statement of why each step was taken. Explain what you need to do to keep comb and brush in first-class condition.

Why are there no public combs and brushes in Pullman cars? Is it neighborly to lend our own combs and brushes to travelers, if we are asked?

It may be necessary sometime to know how to rid hair of vermin. Make a brief and accurate statement of how to proceed. Make a statement of how to avoid vermin in the hair.

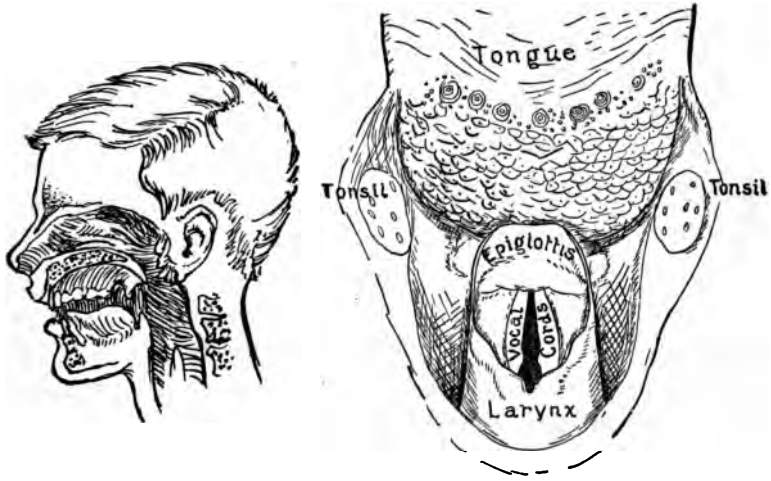
If you were packing your suit-case to go on a trip, what articles must you take to keep your nails in good condition? How would you use these articles? How often?

What is the business value of well-cared for hair and clean nails? The health value? The "beauty" value?

HOW WE BREATHE

We have spoken of every living thing as needing food and water, but equally necessary is *air*, and the apparatus with which we breathe is a most important part of our machinery.

As you know, the nose is lined with moist pink skin, or membrane, provided with tiny hairs. The moisture is to catch any dust or germs, and to moisten the incom-

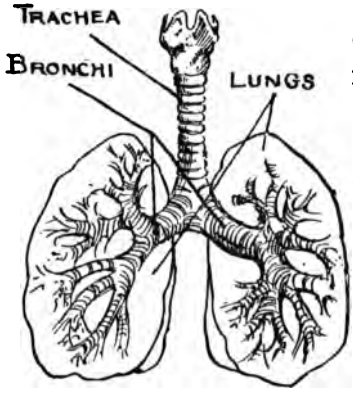


ing air. The hairs also help in catching any dust or tiny insects, or anything else that might injure the nostrils.

If you could look at the inside of your nose, you would see that, back of the "bridge," the nostrils join to form a passage that, lower down, forms the throat. This connection between the nose and throat is brought to our attention when liquid snuffed up the nose runs

down into the throat, and sometimes when the gas from soda water "fizzes" up from the throat into the nose.

The throat, as we have seen, has, leading from it, a tube that carries the food into the stomach. It has a second tube, called the trachea, or wind-pipe, dividing into two branches, through which the air passes down into our lungs. These two branches are called the bronchi, and when they are in bad condition, partly choked with mucus, we have "bronchitis."



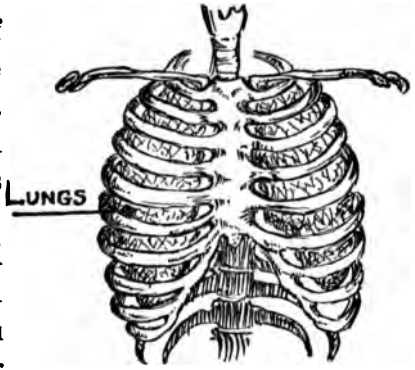
The lungs themselves are spongy, full of tiny holes which fill with air, much as a sponge fills with water. They are pinkish in color, from a fine network of tiny blood-vessels which run all through them.

Now air is composed of several gases, one of which is oxygen. This oxygen is absorbed by the tiny blood vessels and carried in the blood all over the body, to keep the body-fires burning; for the body needs oxygen, just as any flame needs it. You know that a lamp will not burn unless space is left for air to get to it and that you cannot kindle a fire unless there are air spaces between the sticks of wood. I remember once seeing a great pile of paper which had gone through a fire with only the edges singed. The rest of the paper could not burn because the sheets lay packed one on top of the other, with no air between.

Of course there is no *flame* in your body, and yet the

process that goes on in it is really a slow burning, and the air makes this burning possible.

When the needed oxygen has passed from the air into the blood vessels of the lungs, the "waste air" goes back, up the wind-pipe and out the nostrils. Then another breath of fresh air is taken in, and so we keep on night and day, all our lives.

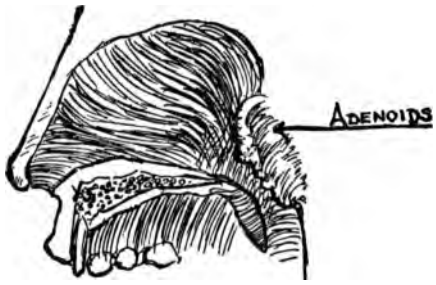


Luckily for us, our breathing takes care of itself and we do not have to remember to breathe. Our ribs pull apart and spread, so that the lungs have room to swell out. Then the air rushes in and fills them. It is very much like what happens if you hold a sponge under water in your closed fist, the sponge being your lungs, the water the air, and your fist the ribs. So long as your fist presses on the sponge, it cannot fill, but the moment you relax your grip, the water rushes into the holes in the sponge and it swells out. When your fist again closes round the sponge, the water is forced out. Just so, the air keeps rushing into your lungs and being forced out again.

Since breathing, like digestion, is a matter that we can do but little to control, many people never think of taking care of their breathing apparatus. And yet these breathing tools of ours are especially likely to get out of order, and especially painful when they do.

Later on we shall have something to say about providing ourselves with good air, but first let us think about getting our tools themselves into good shape, so that they can use the air.

Of course it is plain that anything that stops up the air route, in any of its parts, is a very serious matter. Once in a while, we hear of someone who suffocates because a piece of food, or a button, or coin perhaps, has gotten into his wind-pipe and has stuck there, preventing the entrance of air.



A much more common happening is a stoppage, not in the wind-pipe, which causes death almost at once, but in the passage back of the nose, just above the throat, which causes much trouble.

Adenoids are spongy masses that grow in this passage and so block it and force their unfortunate owner to breathe through the mouth. This means that the air, instead of going through the damp hairy nose, where it is made moist and is cleaned, passes directly into the throat. The throat becomes dry and often sore. Adenoids also often cause earache and deafness. The nose, not being "aired," becomes unhealthy and catarrh develops. There are a great many ways in which adenoids can upset one's entire body and ruin one's happiness and work.

To have adenoids taken out is a simple matter. Any good doctor can do it, and no one should try to struggle

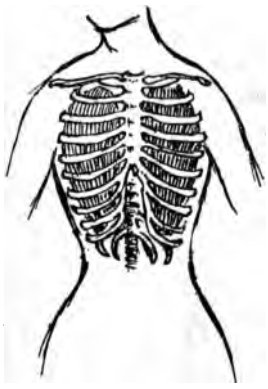
on with adenoids. It is as great a waste of time and strength as it would be to try to sew with a broken needle.

But even if we have no adenoids, and our passage to the lungs is clear and open, of what use is it if the lungs themselves cannot fill freely with air?

Just as a sponge cannot fill with water so long as your hand is partly closed around it, so your lungs cannot completely fill with air if your ribs hold them in a tight cage. This is why tight clothing about the waist is not merely uncomfortable but very unhealthful. When I was a girl, it was the fashion for girls and women to have small waists and many a girl prided herself on her tiny waist and endured tortures from tight lacing rather than have a natural figure. Nowadays it is no longer fashionable to have a "wasp" waist, so women's ribs are almost as free as men's and they can breathe with the lower part of the lungs, not merely with the narrow upper tips.

This habit of "deep" breathing, using and filling with air the entire lung space, is an excellent one. I used to know a boy several of whose family had died of tuberculosis. He was a slender frail-looking, hollow-chested lad, and had quite given up to the idea that he

also was to die of the disease that had killed his sister and brothers. A wise doctor advised him as to better ways of living and among other things, urged him to take twenty long breaths before an open window every morning and night and as many times during the day as he could. He tried it, standing erect and taking long deep breaths and inside six months his chest had filled out, his color was better and he laughed at the idea of having tuberculosis. Now he is as strong as any boy I know.



There are some forms of work that are especially hard on the throat and lungs and which I should not advise you to take up if your throat and lungs are at all inclined to be weak. I suppose any girl who has ever swept a room knows how disagreeable it is to get one's throat full of dust. A girl that I know always ties a damp cloth across her nose and throat when she sweeps, to strain the dust out of the air and to keep from breathing it.

The "dusty" trades, such as stone cutting, grinding and polishing metal, china and pottery making, wood-sawing, and others which fill the air with fine dust are very hard on throat and lungs. Often the machines are equipped with some device that sucks the dust in and so keeps the air clear. In many states, employers in these trades are obliged to supply masks, or "respirators," which protect the worker by straining the dusty air.

Employers have told me that very often the workers

are *not willing* to wear the masks. They say that it bothers them at their work, and some of the women object because the mask is not becoming. This would really be very funny, if it were not that so many workers pay for their folly by weakened and injured throats, and even by actual illness. It really does seem as though, if someone else pays to protect us, we might at least do our part by protecting ourselves.

HOW WE BREATHE

Get a hand-mirror and find for yourself all the devices in your nose which purify the air that goes through it to the lungs. Are there similar devices in the mouth? Try breathing for two minutes through the mouth. Why must you breathe through the nose?

Try to make a picture or diagram which will show the path of the air from the outside to the lungs.

Plan some experiments to show that air is necessary to a fire. Can you find out what there is in air that makes it so necessary? Find out what "oxidation" means? Then show how the body fires are like other fires and how they are different.

Bring to school materials for showing how the lungs fill with air. While you demonstrate your experiment, point out in your own breathing, how it is like the experiment, and how different.

By what means can you keep each part of your lungs active and well-nourished? Will tuberculosis germs have much chance to grow in such lungs? What are your reasons?

What games favor well-developed breathing?

What obstacle is there, to good breathing through the nose? If you had such an obstacle, what would you do about it?

Name some "dusty" trades. Name some "sedentary" trades. (Find out what the word means.)

If you have to work at one of these, what can you do to overcome its disadvantages to health?

THE BREATH OF LIFE

CONSIDERING that air is literally the "breath of life" to all of us, and that we are surrounded by it every moment of our lives, it is rather odd that most people know so little about it and have such wrong notions as to "good" and "bad" air.

Of course, as we said in the last chapter, air is not wholesome if it is filled with dust, or with particles of stone, metal, wood, lint, etc. Neither should it be laden with smoke or gases, such as certain chemicals produce. During the war, we heard a great deal about soldiers being "gassed" and many men had their throats and lungs seriously and lastingly injured by such poison gas.

In factories, the law does not permit any process that would make the air actually poisonous, but the air around a factory that uses acids and other chemicals is often full of ill-smelling and unpleasant gases that make a sensitive throat sore. I have read that concert singers often complain at having to sing in certain cities, because the air hurts their throats.

Country air is, as everyone knows, less dusty and smoky and much sweeter smelling than city air, for there are no factories and chimneys to soil the air and plenty of wide spaces across which the wind can sweep, instead of narrow streets where the air lies stagnant.

But the air in country *houses* is usually no sweeter or more pleasant than in city ones. Indeed, I have been in country homes where the shut-up parlor was so "stuffy" that it gave me a headache. If air is clean, free from dirt, unpleasant gases and dust, what else is needed?

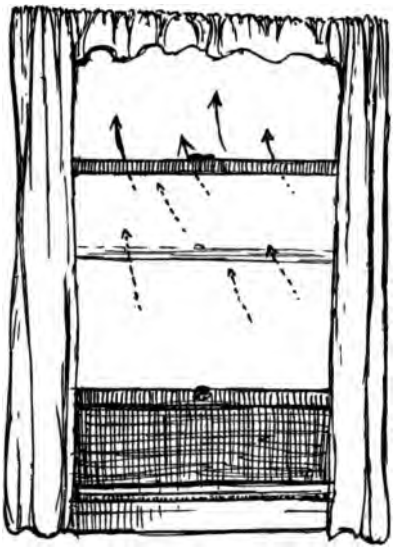
To answer this question, we must understand that air affects the skin quite as much as it does the lungs. Dusty air is bad for the throat and lungs, but it is equally important that air should be of the right temperature and should be moist enough. To make this clear, we must consider the question of body heat.

If you have ever had a fever, you know the dreadful, "burning up" feeling that it gives you and perhaps you were surprised to be told that you were really only one or two degrees warmer than usual. The fact is that during a fever, the blood comes to the surface and makes the skin feel hot and dry, but the general temperature of the body rises only a few degrees. When we are well, a thermometer placed in the mouth registers a little above ninety-eight degrees, and a rise of even a few degrees above this body temperature means that we are seriously ill and have a high fever.

Now how is it that our bodies keep at about ninety-eight degrees even in Egypt, where the air may be as hot as one hundred and twenty-five degrees and in the Arctic regions, where the thermometer falls to fifty degrees?

If, as in winter, we are surrounded by cold air, the tiny blood vessels in the skin contract, so that less blood shall come to the surface and be cooled. In summer, they relax, so that the blood may flow freely through the skin and be cooled as quickly as possible. The perspiration, too,

as we have seen, plays its part in cooling the body, by evaporation. In winter we aid the process by wearing layers of thick clothing, which hold a layer of air about us that has been warmed by the body. In summer, on the contrary, we wear as few clothes as possible and try to find a breezy spot where the layer of air warmed by our bodies will be continually blown away and a fresh, unwarmed layer take its place.



Outdoor temperatures, however, we cannot alter, and to them we merely adjust ourselves. In our houses, we can regulate the heat.

It might be supposed, since ninety-eight degrees is the natural heat of the body that air heated to ninety-eight degrees would be the most comfortable, whereas we all know from experience that when the thermometer registers ninety-eight degrees we are all panting with the heat. The temperature that suits pretty much everyone best is between sixty-two degrees and seventy degrees. At this heat, we do not get blue and shivery, nor do we perspire greatly.

I know a family where the grandmother always insists on having the sitting-room heated to eighty degrees. The

result is that her grandchildren have a series of colds all winter long. The overheated air indoors keeps their skin-pores open and the perspiration flowing. When they go out, the perspiration evaporates and makes them feel chilly and uncomfortable. Then too, in a very warm room, the blood comes close to the skin, so when one goes out into the cold, the blood is suddenly chilled and one "feels the cold," as we say.

Another danger in connection with over-heated indoor air is that it is usually very dry.

You often hear people complain, on a "muggy" day, of the "humidity," which is only a long way of saying *dampness.* And if you have ever been out on the desert plains of Arizona and New Mexico, you have suffered from the extreme *dryness* of the air. I remember that on a journey across those plains, my skin felt as if it were drying up, and the skin on my lips actually did dry and crack.

Now, as we all know, the air always holds more or less water. You have often seen the sun "drawing water" into the air, and watched the steam from the tea-kettle disappear into the air of the room.

On a warm day, if there is a great deal of water in the air, the air, naturally, does not dry up our perspiration so quickly and we miss the coolness that comes from evaporation. On such a day the air is like that of a hot-house, warm and soaked with moisture. On a dry-air day, the thermometer may stand much higher and yet, as we perspire freely and the perspiration quickly evaporates, we do not feel the heat so much.

The danger, indoors, is usually that of having the

air too warm and too dry. If, in a room at 68°, you feel chilly, the air is probably too dry, which means that the moisture from your skin is evaporating too quickly and thus cooling your skin and giving you a chilly feeling. The remedy for this is not to make the room air hotter, but to make it moister by boiling water, by putting dishes of water or wet cloths on the radiators, or by having growing plants in the room. Plants give out water from their leaves and from the wet earth. Of course, the air must not become so damp that the perspiration will not evaporate. About one third to one half is the right amount of moisture in the air, depending on its warmth.

In work-rooms, where a large number of people are often working all day, it is very important for everyone's comfort that the air should be free from dust and smells, comfortably warm, sufficiently moist, and kept in motion. If those near the windows complain of a draught, a good plan is to close the windows, but every fifteen or twenty minutes open them wide for a moment, to give the room a good "airing out."

Anyone whose work keeps him or her indoors all

day should try to get as much fresh air as possible on the way to and from work and at the noon hour and on holidays. And by all means, try to sleep in fresh, outdoor air. No matter how we try to regulate the air in our houses, outdoor air will always be the best. Therefore get all you can of it. A doctor once told a young lady who wanted to improve her complexion that she must buy a box of the best rouge, bury it two miles from her home and then go every day and dig it up, and she would surely do her complexion a world of good!

These, then, are the main things to remember about "the breath of life,"—air. It should be clean. Indoor air should be between sixty-two degrees and seventy degrees and moist enough to be comfortable at these temperatures. Lastly, air should not be stagnant, but move in gentle currents about the room so that our lungs and skin may have, constantly, a fresh supply. But do not forget that man is an *outdoor animal* just as much as the horse or the monkey, and should live outdoors just as far as possible, if he wants to keep his health.

THE BREATH OF LIFE

What are some impurities in city air absent from woods or mountains?

Which is worse, "house" air in the country, or outside air in the country? Give reasons.

Air affects the skin as well as the lungs. What are two ways in which this is possible?

Try to explain why your body would have the same temperature in India as in Greenland. To do this answer these questions:—

(a) Where does the heat of your body come from?

(b) How do the blood vessels of the skin behave when cold strikes them?

(c) What kinds of clothes do we wear in winter?

(d) How do blood vessels of the skin behave when it is hot outside?

(e) How does perspiration help us to keep cool?

(f) Why does a breeze help us to keep cool?

(g) What clothes will keep us cool?

If you stay in a room heated to eighty degrees in winter, what will happen if you suddenly go outside, or into a cold room?

When do clothes dry faster—on a damp, dry, still, or windy day? In what kind of air will your body lose least heat? Why, then, is it better to have your room cool and the air moist, than hot and dry?

Think of yourself as the manager of a workshop, or the mother of a household. What things will you remember about the air you provide for workers or family?

Name all the ways you can, of getting these good conditions.

Name all the opportunities that a city worker in factory or school or shop has of getting plenty of fresh air.

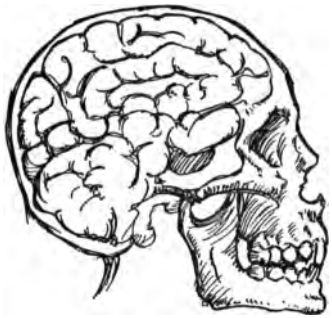
What may be one reason why Indians and Eskimos frequently die of lung diseases when they try to live as we do?

What provision do you make, in your daily life, for getting plenty of fresh air?

BRAIN AND NERVES

In talking about posture, we said that even a strong, healthy body could not hold itself erect—it must *be held* so by a healthy brain. A small baby is unable to stand, not merely because his muscles are not strong, but even more because his brain and nerves are not yet developed and trained.

The nervous system is not at all a simple affair and it is not necessary that you should know a great deal about the structure of the brain and the long names that scientists have given to its various parts. The main thing is to know how to *use* your brain and not abuse it, so that it may serve you long and well. I know a man who can talk for hours about the brain and nerves, the functions of the brain centers, the nature of nerve tissue, and so on, but he either does not know or does not care anything about the right way of living, working and resting, to keep his brain clear and his nerves steady. He always reminds me of a man who took a correspondence course in order to become a chauffeur. He learned every part of the automobile and could explain just how they worked, but the first time he tried to run a machine, he utterly lost control of it and had a smash-up.



Still, in order to take intelligent care of your body,

you must understand, in a general way, its parts. If you look at the illustration, you will see that the brain is an irregularly folded mass of tissue, carefully packed into the skull for protection. From the under side of the brain, toward the back, descends the spinal cord, also protected by a series of bones through which it is strung, as a cord strings beads. This chain of bones forms the spinal column, or backbone, as we usually call it.

From the spinal cord, an infinite number of smaller cords, or nerves, branch out all over the body. It is as if the spinal cord were the trunk of a tree, the main nerves, going to arms and legs, the stomach, heart and other organs, being the branches, and the smaller nerves the twigs and leaf-stems.

But, though the nervous system looks somewhat like a tree, it is really more like a telephone system, with the brain as "Central," to whom all messages come and who links together all the parts.

If anything happens to "Central," the whole system is put out of commission, instantly. I remember that once, in a very hot room, I suddenly felt "queer." The blood had all rushed to my skin, in an effort to get cooled, leaving but little blood in my brain. The result was that the

nerves leading to my eyes did not act and my eyes began to "swim." Then suddenly the room vanished and I, though I did not know it until later, dropped in a heap on the floor.

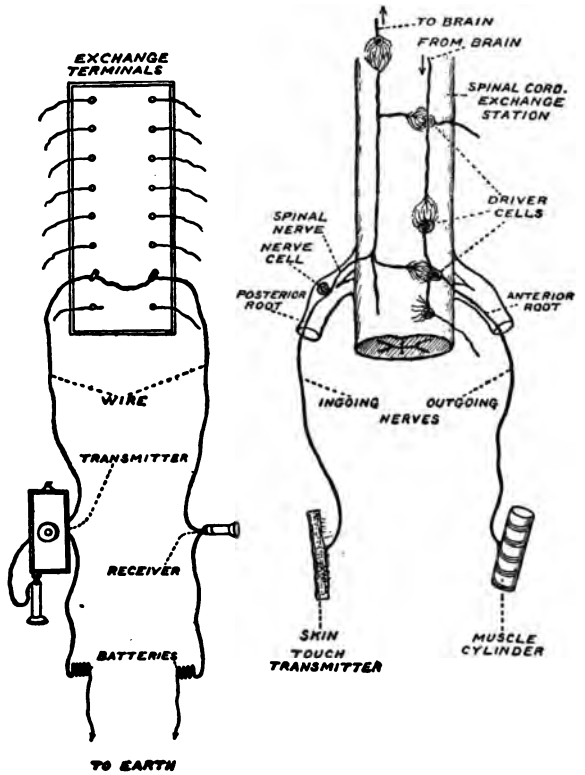
I was picked up, laid out flat, so that the blood would run back into my brain and also dashed with cold water. The windows, too, were thrown open, so that my skin cooled, my brain filled again with blood, and I "came to," as we say. But it was a great surprise to me. I had always known that the brain controlled the body, but I had never before *realized* how utterly helpless the body is without the brain. If the brain is injured or for the time being useless, as in a faint, we cannot see, we cannot hear, we cannot move, we cannot even hold our bodies up —we fall down, a useless, helpless mass of bones, muscles and flesh.

If the injury to the brain is sufficiently great, we not only are robbed of sight, hearing and motion, but our lungs cease acting, our hearts stop beating, and we die.

But if the nerves without the brain are useless, the brain without the nerves would be equally so. It would be like a central telephone bureau with no exchange

branches and no wires. It is through the countless nerves that the brain sends and receives its messages to all parts of the body.

If a pin pricks your finger, the message runs along

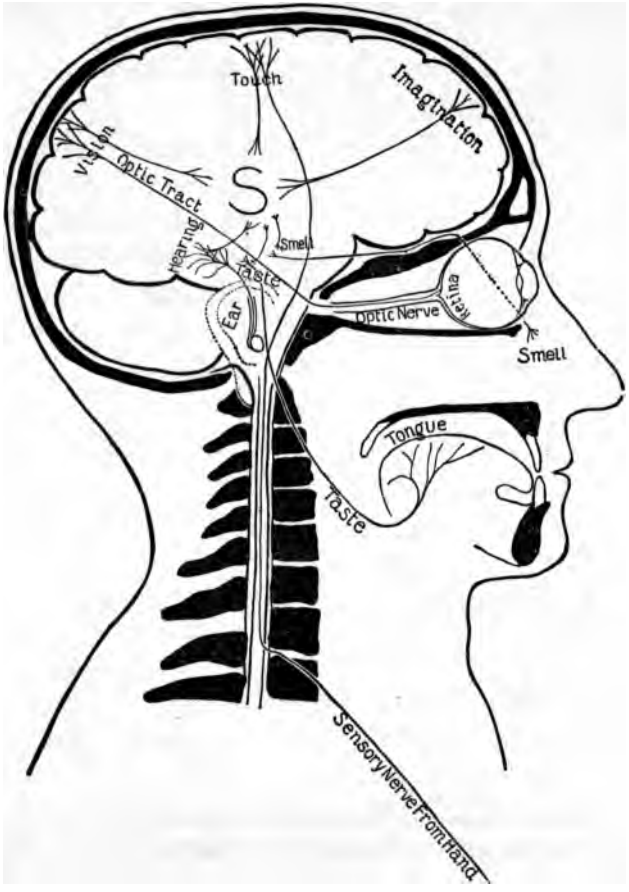


Reprinted by permission from "Engines of the Human Body," by Prof. Sir A. Keith

the tiny finger nerve, through the hand, up the arm and shoulder and so to the brain, and instantly you "feel" the pin-prick.

The nerves also serve to send messages *from* the brain, to the various parts of the body. If you wish to move your hand, the brain sends out its order along the

nerve and the muscles are moved. If the nerves leading to any part of the body were completely cut, it



would be as impossible to feel pain in that part, or to send any message to it, as it is to send or receive a message over a telephone whose wires have been cut.

Now, how shall we care for our nerves and brain, so

that they shall be quick to send and receive messages? In the first place, we must always remember that every part of the body depends on every other part. Anything that is good for the general health is also good for our nerves and anything that lowers our health is also bad for our nerves. Good food, plenty of fresh air and exercise, right posture, will all help us to have strong, alert nerves, and an active brain. You all know that when the air is very hot and stuffy it is almost impossible to study—your brain just won't "go." Sometimes also, after a very heavy meal, we feel so stupid that our brains almost refuse to act.

The brain and nerves, like every other part of the body, need exercise, and very few people injure themselves by overworking the brain. I remember a foolish woman who used to say to me, "Poor Robert! He had to study so hard at public school that I decided to put him in a private school. I was afraid he would injure his brain."

No, good hard work, with brain or muscle, almost never hurts anyone. In fact, brains, like muscles, are made stronger by exercise and it is good for us to pin our minds down on a problem and work at it until we master it. The boy or girl who likes to read easy, amusing books, but hasn't the grit or patience to tackle anything that requires real thought or work is never going to have a really strong, capable mind. His brain is going to be like a soft, flabby muscle that has never been used and trained.

Of course, this does not mean that we should drive our brains hour after hour and whip them up with

tea or coffee, as one whips an over-tired horse. I know some young people at college who make a habit of fooling away their time and studying very little until just before mid-year examinations. Then they sit up until one or two o'clock in the morning "cramming" and drinking black coffee to keep themselves awake.

If your brain had a voice, it would cry out in protest against this silly business of being kept idle for weeks at a time and then suddenly forced to hard work, and dosed with harmful drugs. You know that any man who wants to develop his muscle practices every day. He does not loaf for a week and then work his muscle violently for a whole day. It is the same with the brain. We should form the habit of using our brains in our daily work, of studying and thinking. Then we shall little by little, build up a brain that is really worth something and can be depended on to serve us.

BRAIN AND NERVES

Try to make a diagram showing the connection between the brain, the spinal cord, and the spinal nerves.

Tell how these are protected.

Tell where the nerves go, when they leave the cord.

What has your brain to do with the movements of your body?

Can you tell how the brain is able to send and receive messages from the whole body? Do so by a comparison with the telephone system in your city.

What can we do for the nerves and brain, to keep them in good healthy condition? Why do doctors tell us that alcohol or coffee injure our brain and nerves?

Explain how a boy can develop hard muscles in his arms. Explain how he can develop a strong, actively working brain.

Name some amusements which are bad for the development of active brains. Can you tell why they are so?

Lincoln, Edison, Pasteur were men whose brains gave them power. Make a brief study of how each lived, and show how their ways of living helped to develop what brain power they had.

NERVES AND FATIGUE

It is true that anything which is good for the health of the whole body is good for the nerves and anything that injures any part of the body also, to some extent, weakens the nervous force. There are, however, certain habits that are especially bad for our nerves and certain ways in which we may learn to avoid wasting nerve force.

One of the worst habits in the world is that of worrying. Scientists declare that it is possible to lie in bed without doing a stroke of work and yet, by worrying, to use up more strength in a day than the body can manufacture in the same length of time. Just exactly *how* the mind affects the body, just what the nerves do to the blood, I shall not attempt to explain, for scientists do not really know, but it is quite possible to "worry oneself sick," as the saying goes. Everyone who has ever tried to eat when he was very unhappy, or angry, or worried, knows that an upset brain means an upset stomach. It is almost impossible, under such circumstances, to eat. Sometimes the throat really seems to

half close and we say the food "sticks in our throat." If we do succeed in swallowing a meal, it is more than likely to disagree with us, for the nerves which run to the stomach are also affected and the stomach cannot work properly.

I remember, years ago, reading an old fable that ran something like this:—One day the Plague stalked abroad through the land, and on his way he met a peasant. The peasant fell on his knees in dread and prayed to the Plague, saying, "Oh dreaded Plague, pass by our village. We have done thee no harm. Spare us and we will erect altars in thy honor and worship thee."

The Plague smiled a mocking smile and said, "I am not so cruel as men think. Out of this village, I will take only five men to satisfy my hunger. The rest I will not touch."

The peasant went home greatly rejoicing, but as the days went by, not merely five men fell ill and died, but one after another sickened. The villagers were panic stricken. Everyone talked of the horrible Plague, and many left the village and took refuge in the hills. Among these was the peasant. Finally the Plague lessened, but five hundred villagers were dead. As the peasant walked sadly home from the hills, he again met the Plague and bitterly upbraided him. "Why didst thou promise to kill only five?" he cried. "Liar! Thou hast slain five hundred." But the Plague laughed. "No, no," he replied, "I kept my promise. I killed only five. It was my brother Fear that slew the rest."

As fear and worry can make a healthy person ill and

will always make a sick person worse, so cheerfulness helps to cure the ill and to keep the healthy in good health. There is no truer sentence in the Bible than, "A merry heart doeth good like a medicine."

Yet, no matter how cheerfully we may work and how free we may keep from worry, there really is such a thing as overwork. Overwork does not mean working *too hard*, but working too steadily and *too long* at one special task, without stopping to rest.

If you play the violin, you know that it does not do to keep the strings tightly stretched all the time. When the violin is not in use, the strings are slightly loosened, then tightened when you tune the violin before playing on it.

Men who work with metal speak of "fatigue" in connection with strips of metal. By this, they mean that if a strip of metal is kept rapidly vibrating, it becomes weakened and is easily broken. If it is made to vibrate for a few minutes and then allowed to rest, no weakening results.

Now our muscles and nerves need rest periods far more than do steel strips or violin strings. And if we persist in keeping them at work hour after hour, they cannot keep on doing good work and are likely to be permanently weakened.

As our muscles and brain work, they produce waste substances, much as the fire in an engine produces ashes, and if these waste substances collect faster than the blood can carry them away, they act as poisons.

A Mr. Gilbreth, who has made a special study of this

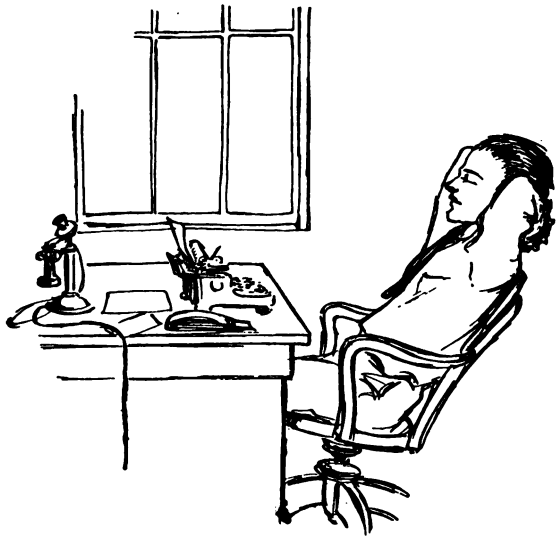
question of fatigue, tells how, in a certain factory, the girls learned to do more work, earn more money and feel less tired. He says that the girls folded handkerchiefs, and they had been in the habit of resting for an hour at noon and working all the rest of the day without any set times for rest. They found that in the afternoon the girls became very tired and could not get nearly so many handkerchiefs folded as in the morning when they were fresh. They were paid by the piece, not by the hour.

By the new method, the girls worked for five minutes, rested one minute, worked five minutes, rested one minute. This they kept up for twenty-four minutes. Then for twelve minutes they *stood,* working five minutes and resting one. Then, for eighteen minutes, they either stood or sat, as they pleased, resting one minute after each five minutes' work. If you add these three periods of twenty-four, twelve and eighteen minutes, you will see that they make fifty-four minutes, just six minutes less than an hour. This last six minutes in each hour the girls spent in walking about, talking or doing whatever they pleased to rest their muscles and nerves. So the day went, with a minute's rest after each five minute's work and six minutes' rest at the end of each hour.

Mr. Gilbreth says that the girls, by this method, earned over *three times* as much as they had ever been able to make before, were more interested in their work and said they were less tired at the end of the day.

Of course in many workshops you will not be able to stop and rest so frequently. But you can often pause

a moment and take a long breath, throw back your shoulders and stretch. It will help you to work better. And while you are working don't think that it will rest you to dawdle over your work and do it in a half-hearted way. Work to the very best of your ability, give your



best self to your work, and when you rest forget all about it and play just as hard as you worked before.

A great many boys and girls who go to work for the first time do not realize that to be a really good worker, one must be a good player and a good sleeper. By being a good player, I mean that one must play with all his heart and that he must make today's play help with tomorrow's work.

If your work keeps you humped over a table all day,

it is well to get some fresh air and exercise in the evening and on holidays. If you are an errand boy and are on your feet and outdoors most of the day, you will enjoy quiet, indoor sport in the evening.

The matter of sleep is a very serious one. I know a boy who is a clerk in a store. He dearly loves the theater. So do I; I do not blame him for that at all. But instead of going to a seven o'clock "movie" and attending the theater on Saturday nights when he can lie abed the next day, he goes three or four times a week to motion pictures, arriving at nine o'clock and getting home after eleven. As he has to get up at six in order to get to work in time, he has only seven hours of sleep —not nearly enough for a young, hardworking body to get "rested up."

During sleep the entire body is relaxed. To be sure, the heart and lungs still keep working, but, as you know, even they do not work so hard as when we are awake. The heart beats much more slowly and you can tell when a person is asleep by the long, slow, regular breathing.

And while the body is relaxed, the blood washes all through it, carrying off waste matter and refreshing us and making us ready for the next day's work.

If the body is not thoroughly rested each night, by a good long sleep of at least eight hours, it begins the day badly and before night is worn out. Fatigue means accidents. In the factories of Illinois, a record of accidents was kept for one year, for each hour in the day. It showed that the fewest accidents occurred during the first hour's work and during the first hour after the

noon rest. The largest number of accidents in the whole day happened between four and five in the afternoon,

when the workers were tired. Lack of sleep means lack of strength, lack of strength means fatigue, and fatigue is pretty sure, some day, to mean an accident.

NERVES AND FATIGUE

Explain the "parable of the Plague" told in this chapter.

Can you tell any story which shows how fear weakens the body?

Can you tell a story which shows how courage, or faith, strengthens?

In what way will overwork injure a person? How can a person work very hard and very long, and yet not be injured?

How is it that your heart can beat day and night for seventy years or more without being overworked?

Explain the improvement the girls made in handkerchief folding as it is described in your chapter.

Could you apply that idea to any work that you do? Make a program of work for yourself which shows you understand the improvement in work.

How should you modify your recreation to suit the kind of work you do?

How much sleep do you need? How much do you get? How must you change your habits to get the proper amount?

What changes making you fit to do your day's work take place during sleep?

Prove by some examples, that there is a relation between accidents in factories and fatigue.

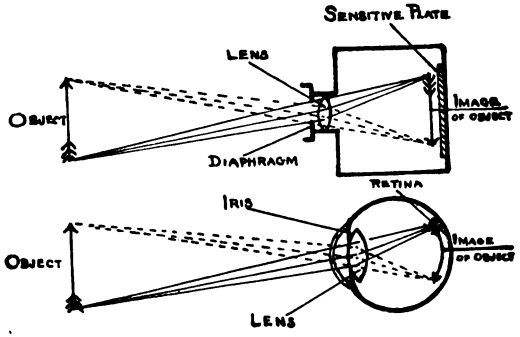
THE TOOLS WITH WHICH WE SEE

Of all the nerves which carry messages from the outer world to our brains, none are more useful and none more abused than the nerves of our eyes.

If you look at a skull, you will see the bony hollows each side of the nose in which the eyeballs lie, and in the back of each bony socket, you will see a small hole. It is through these holes that the eye-nerves pass to the brain, for the eyeball is only an instrument for catching pictures and the nerve a wire for passing them on—it is the *brain* that really *sees*. We know this because even if the eyeball is perfect, if the nerve is cut, we cannot see, while, even with our lids closed, so that our eyeball receives no pictures, our brain can recall images and see scenes long past. Blindness may be due to several things, to an injury to the eyeball, so that no picture is formed, an injury to the nerve, so that the picture cannot be sent to the brain, or an injury to the fore part of the brain, so that it cannot receive any impression from the nerve.

The eye has often been compared to a camera and it really is very much like one, as you can see by the

illustration. It has a lens, as the camera has, which makes a picture upside down on the black lining, or retina of the eye, just as the camera lens makes a picture upside down on the plate. One difference, however, is that the photographer has to use a fresh plate for each picture. In the lining of the eye, the picture is



bleached by the light on the dark ground, but the dark coloring matter is constantly renewed, so that we are able to see as many as eight different things, one after the other in a single second.

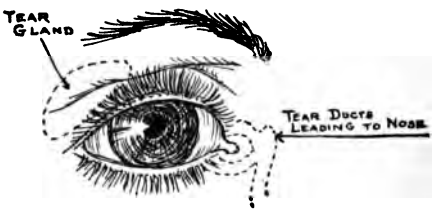
We might suspect that our eyes were among our most precious tools, from the way that Nature has packed them carefully and protected them on every side. They are not only sunk in bony hollows, but eyebrows, eyelids and eyelashes all help to keep dust, insects and sharp particles out of the eyes, and to protect them from too much light.

At the outer side of each eye is a tiny bag or gland that manufactures tears, so that when anything gets "into your eye" as you say, it may be washed away.

Of course nothing but a sharp instrument of some

kind can really get *into* your eye, for the lens, as you can see in the picture, is protected by a clear sort of watch-glass arrangement called the "cornea."

The lens is also protected from too much light by the iris—the colored part of the eye, which acts like the shutter of the camera and has a hole in the center called the pupil. The pupil looks black because through it we see the black retina lining the eyeball.



You know that in taking a picture, the camera must be adjusted according to the distance of the object to be photographed, and probably you have seen the photographer slide the front of the camera containing the lens back and forth, until it is at just the right distance to make a clear, sharp picture.

The eye lens, too, needs to be focussed, so that a clear picture may fall on the retina, but we cannot keep moving our eyes nearer or farther away all the time. Imagine how awkward it would be if our eyes were "set" for taking pictures at a distance of twenty inches. We should be able to read comfortably, but we could not see across the room—all would be a blur. Or, if our lenses were focussed for a distance of eight feet, we should be able to see pictures on the walls of our rooms, but if we tried to read a book, the print would be a blur.

To get around this difficulty, the lens of the eye is made not of stiff, unyielding glass, like the camera lens, but of a sort of clear, elastic material, like a very stiff jelly.

When an object near by is looked at, the muscles pull, so that the lens bulges out farther. When a far off object is seen, the muscle relaxes and the lens is flattened. In each case, a distinct picture is made on the retina.

You will understand this much more clearly if you can experiment with two or three lenses, such as a hand magnifying glass of good size and one of the round glass dishes which stationers sell for holding odds and ends on one's desk. The latter forms a much more bulging or convex lens. By holding up a piece of paper and letting the light from the window fall through the lens upon the paper, you will find that at a certain distance, you can throw a perfect, upside down picture of the window on the paper. But you will find that the paper must be much nearer to the very convex lens than to the other, to make the picture clear.

The reason why reading, sewing and close work is harder on the eyes than just gazing off into the distance is that, as you can see by your experiment, the lens must be made convex, and this means that the muscles must pull, to make it so.

For such close work, we need a steady, fairly strong light. It is very foolish to try to read or write at night by a flickering gaslight, or to try to sew on black material by artificial light. You can see, by trying it with your lenses, that a good light is needed to make a clear picture.

Another important thing is to have the light come from the left, so that your work is not shadowed by your hand, and from behind, so that the light does not shine into your eyes. If you have ever watched a photogra-

pher, or taken pictures yourself, you know that no good picture can be taken facing the sun. The sunlight must be *behind* the photogapher and shining on his subject. If at your work, the light is so placed that it must be in front of you, pay ten cents for an eye-shade and save your precious eyes. Remember, too, not to hold the work close to your eyes.

Unless one's eyes are naturally very strong, it is a mistake to take up any sort of work that requires extremely fine and close work, such as watch making, fine jewelry work, continual use of a microscope, etc. And of course no one should be so silly as to read very fine print.

We do not always suspect that our eyes need care. Sometimes eyes that are out of order show it by watering, aching, or having red lids, but sometimes eye strain shows itself in quite other ways, for, as I said, we are all "made in one piece" and trouble with the eyes may make trouble in other parts of the body.

I know a lady who used to have headaches, especially if she read or sewed or went to a motion picture. She tried various things but her headaches continued. Finally she went to an oculist, who found that her eyes were

out of order. He fitted her with glasses whose lenses helped to make things clear and distinct without the

Figures on blackboard sharp and clear. This is the way they look to the child with abnormal eyes after he has been properly fitted with glasses.

Blurred picture of schoolroom, showing how room looks to a child with astigmatic eyes.

lenses of her eyes having to work so hard, and her headaches stopped at once.

Some people have a silly dread of going to an oculist

and I have even known one man who used someone's else glasses, rather than have his eyes examined and get proper glasses. There are many eye clinics and hospitals now where one can have a free examination and obtain glasses at cost and no one should try to worry along without glasses if his eyes need them.

Another way in which many people run great risk of injuring their eyes is by using public towels, rubbing their eyes with dirty fingers, and in other ways getting dirt or disease germs inside the eyelids. Make it a rule to keep your hands *away from your face.* By using a public towel, you are likely to catch a fearful eye-disease called trachoma, which may even end in blindness. Don't take the slightest risk. If separate towels or paper towels are not provided in any place where you are studying, travelling or working, carry your own towel with you.

Another way in which eyes are injured in many workrooms is by flying bits of steel, stone or dust. Usually workers are protected by goggles in trades where such sharp particles are likely to be flying about. But too often they grow careless and will risk losing their eyes rather than take the trouble to put on the protectors.

If you will just close your eyes for a moment every now and then, when you are doing fine work, or gaze off out the window, far away, to let the eye-muscles rest, you will find it a great help.

When I was a child I had a friend who was blind. She was very sweet and patient, but the sight of her constant, uncomplaining affliction made me realize how precious my eyes were. "One pair of eyes for life!" Try

to realize that and don't abuse the tools without which you would be helpless.

THE TOOLS WITH WHICH WE SEE

Can your camera see? To what part of your seeing apparatus does a camera correspond? Try to get a camera—point out the likenesses and the differences, between it and your eyes in the work the parts do.

With what part of your seeing apparatus *do* you see? Could you prove this?

Make a list of all the things that nature has given you to protect your eyes.

Think of your eye again, as a kodak. How do you "set" it, to take a picture afar off? Close by? How is your eye set for the same thing? Why might this arrangement make some part of the eye tired?

Try the experiment with lenses, described in this chapter. What kind of lens gives the best picture, when held close? What kind of light gave the clearest image? Apply these observations to your ways of reading or sewing. Are your ways good?

Make a list of "light" rules to guide you in care of your eyes.

Explain how headaches or even indigestion might come from strained eyes.

What can an oculist do for your eyes?

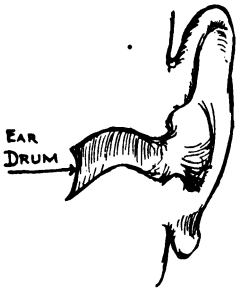
How can germs causing eye diseases get into the eyes of healthy persons?

How are you going to protect yourself from such dangers?

How can you rest your eyes while working?

CARE OF THE EARS

Just as Nature has carefully protected our eyes by embedding them in bony sockets, so she has protected our ears by packing them—the really important part of them—away in our skulls. What we ordinarily speak of as our ears are only the trumpets which help to catch the sounds and carry them to our inner ears. These outer ears can be quite destroyed without our hearing being really much affected.



If you could see into your head, you would find that your outer ear-trumpet runs into a narrow tube, much as the spreading rim of a phonograph horn narrows into its base. But you would notice that this tube is not straight, but runs up and then dips sharply down. This up and down arrangement makes it much harder for any dust, liquid or any other hurtful object to get into your ear than it would be if the tube were straight, or if it slanted downhill all the way.

In order to help still further in keeping intruders out, the tube is lined with tiny hairs and pours out a sticky, yellow "earwax," just as the rest of your body pours out perspiration. The ear is like an ancient castle that had to be defended by moat and drawbridge, for besides being approached by a winding tube, with hairs and wax, it has at the end of the outer tube, a tightly stretched membrane like a drum-head, which we call the ear

"drum." This membrane is very useful in keeping water, insects and all other bodies out of the very delicate ear-parts which lie on its inner side. We can hear fairly well without the ear drum, but it is most important that it should not be broken, for, as I said, it keeps out dangerous substances and also helps to keep the inner ear from becoming too dry from exposure to the air.

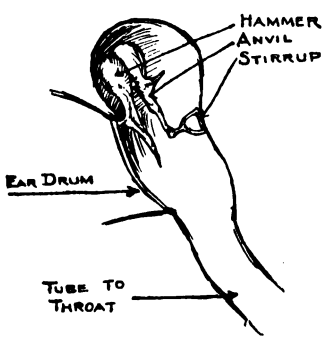
Many people, in an effort to be clean, dig at their ear-tubes with a hairpin, or other sharp instrument, pushing the wax against the drum or even poking the hairpin in so far that it may break the drum. I have often seen a man scratch the inside of his ear with a tooth pick or the head of a pin, as unconcernedly as if he were not taking a fearful risk.

If one is working at a very dusty trade, so that the ear-tubes are filled with dirt, they should be carefully washed out at night with warm water, but never dug or prodded.

If any small object gets into the ear, it can often be shaken out by tipping the head over on that side, then pulling the outside ear downward. This tends to straighten the tube and let the object fall out. But if we try to dig it out, we are likely to push it clear over the "hill" in the tube and down against the ear-drum. If a very little shaking or hot water does not end the trouble, see a doctor and let him do what more is needed. The ears, like the eyes, are too delicate to "fool" with.

Another thing to remember is that blowing into the ear or "boxing" it, is likely to break the tightly stretched drum, just as an explosion will often break a window.

If you study the picture, you will see that, on the inner side of the ear-drum, the tube widens out into a larger space. This is called the middle ear. From its lower side there runs a tube that goes into the throat. When you swallow, you can feel the air go up this tube into your middle ear. The object of the tube is to make the air pressure equal on both sides of the drum-membrane, so that it shall be flat and not bulge either in or out. In going through a railroad tunnel, the heavier air often presses disagreeably against the ear-drum, but if you yawn or swallow, the air rushes up the tube from the throat, presses against the *inner* side of the membrane and keeps it flat by making the pressure on both sides equal.



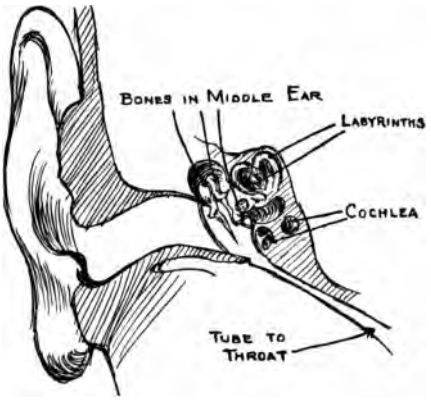
In mines, in caissons under water and in other underground work, this matter of keeping the air pressure equal is important, for the dense, heavy air in such places puts a great strain on the workmen's ears.

The same thing is true of anyone like an aviator who is obliged to rise suddenly to a great height where the air is much rarer and lighter, making the pressure from the outside much less than from within, so that the drum bulges out.

If you look at the illustration, you will see, just inside the ear-drum, three tiny bones, fitting into each other. From their shapes they have been named the hammer, anvil and stirrup. The stirrup rests against a hollow

bone which winds round and round like a snail shell and contains a great many nerve fibers.

Just above the "snail shell" or to call it by its Latin name, "cochlea," lie several bony tubes and spaces, like loops which are lined with a skin or membrane. In this membrane are the endings of countless nerve fibers. These nerve fibres, like the nerve fibres in the cochlea, join to form a larger nerve thread and the nerves from the bony tubes and from the cochlea join to form the big nerve of hearing, which carries messages to the brain.



To understand clearly just how sounds reach these nerve fibers, we must remember that sound, like heat and light, is produced by *motion.*

If you draw a piece of steel against a stone, it will make a slight sound. If you rub it back and forth for some time, the stone will begin to be heated. If you continue rubbing, or strike the stone quickly and violently with the steel, it will make a spark. The sound, the heat and the spark of light were all made by *motion,* either slower or faster.

Sounds are usually carried to us through the air. If you make a rapid pass through the air with a limber cane or whip, you hear a "swishing" sound. The cane moving quickly made the air move quickly from its path.

The moving waves of air struck your ear-drum, and made it, in turn, quiver, just as, if you blow against the surface of a glass of water, it will quiver.

The quiver from the ear-drum was passed on to the hammer, anvil and stirrup bones and by them it travelled on to the cochlea, and the bony tubes and loops where the nerve ends were set quivering. Then the message ran along the nerve to the brain, and you *heard.*

I said that sounds were usually carried to us by *air*-waves but they may be carried in quite a different way.

If you stop your ears as tightly as possible and then hold a watch between your teeth, you will hear it tick very plainly. In this case, the watch's motion was not carried to your ear-nerves by means of air-waves striking against your ear-drum. It was carried by setting your teeth quivering, and from the teeth the tiny quiver ran through the bones of your head and so reached the nerves and found your brain.

I remember a deaf lady who always carried something that looked like a black fan, which she laid against her front teeth. She told me that it was an instrument for catching the air-waves, much as the outer ear does, only that the wave's motion went through the teeth-and-skull-route instead of the ear-route.

Of course such an instrument helps the hearing only when it is the ear *bones* that are at fault. When it is the ear *nerves* that are useless, no instrument can help.

Since about one grown person out of every three is more or less deaf, and since many are dumb because they lost their hearing in babyhood, everyone ought clearly to understand what to do and not to do to keep *his ears sound* and healthy.

The main thing is to know what *not* to do, for healthy ears need no special care beyond keeping up the general health of the body.

The old maxim, "Don't put anything smaller than your elbow into your ear," was based on common sense. To it we might add, don't put any liquid but warm water into your ear. If a hot water bottle does not relieve an earache, lose no time in going to a good doctor. Your inner ear is very delicate, very near your brain. A "running ear" may develop into a real danger.

Examinations of school children show that a great many have the beginnings of ear trouble or even serious deafness. If such trouble is taken in time, it may often be cured, and every school child's ears should be tested. Often a child or even a grown person is thought stupid when really he is deaf.

To test your ears, shut your eyes, so that they cannot help you, and then let a friend hold a fairly loud-ticking watch at different distances. If you cannot hear it when it is over thirty inches away, you should have your ears examined. Try first one ear and then the other, stopping up the ear that is not being tested.

Deafness is one of the worst handicaps that any worker can struggle against. It makes it very hard to get or to keep many kinds of work and it deprives us of many pleasures. So look out for your ears, in order that they may serve you long and well.

CARE OF THE EARS

Make a list of the safeguards which Nature has placed around your inner ear. Why is this part of the ear so important?

What are the safe ways of cleaning our outer ears? What things dangerous to the outer ear may we sometimes do?

Explain why swallowing relieves the stuffy feeling in the ears felt when going through a deep tunnel, or when you have a bad cold. (This may seem hard at first, but if you read the chapter carefully, you will find the reason.)

Find the picture which shows the whole hearing apparatus. Name all the parts and their relations to each other without looking at the printed explanation. Show, on this picture, where the nerves are which help in hearing.

Make the experiments spoken of in this chapter to produce sound. Try to tell how these sounds are produced. Turn again to the picture and show on it how the sounds must travel, before you hear.

Try the experiment of closing your ears and holding a watch between your teeth. How now, does the sound reach your ear nerves? Describe a piece of apparatus working on this principle, used by deaf people. What kind of deafness could be so helped?

How can you find out if your hearing is normal? Is it? How could this knowledge be useful to you?

Is it of any earning value to you to have good hearing?

Make as long a list as you can of things you should do to preserve your hearing.

COLDS—HOW TO CATCH AND HOW TO AVOID THEM

THE general term "a cold" covers more sorts of misery than any other word. It is used to mean almost anything, from a slight case of "sniffles" to bronchitis or tuberculosis.

If you ask how colds are caught, you will receive almost as many different answers as there are people to answer. One will say that he catches cold from wet feet. Another will say that she ran bareheaded to the corner to post a letter. Another will explain that his cold came from a draughty sleeping car. And still another will declare that his was caught from another member of his family.

It is quite possible for a cold to be caught in any one of many different ways, but we are often mistaken as to the way in which our particular cold was caught.

We say, for instance, that wet feet lead to a cold. Now, as a matter of fact, while wet feet are uncomfortable, they will very seldom, *so long as one keeps exercising,* cause a cold. Colds are caused by coming indoors and *sitting* in wet shoes and stockings.

The reason for this is that all colds not directly caught from another sufferer are due to some interference with the circulation of the blood.

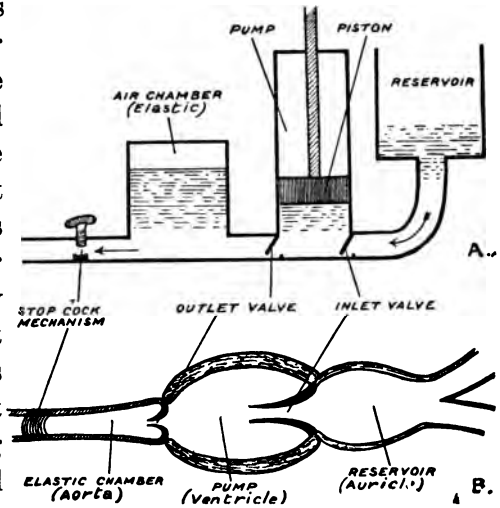
If the blood is flowing at a good rate throughout the body, every part is well warmed, but the blood does not collect and, as the doctors say, become congested, (which simply means "crowded") in any one place.

Now, while you are tramping along in the rain, the exercise keeps your heart pumping away at a rapid rate,

the blood moves quickly all through your body, and you feel no chill.

But when you come in and sit down, your heart beats more slowly, driving your blood at a slower pace. As

the blood flows through your feet, all the tiny blood vessels in the skin have time to be chilled by the wet stockings and the longer you sit, the more of the blood is thus cooled. This chilling of the skin, as you know, causes the blood vessels to draw together and let less blood come through. The result of all this is that the blood no longer flows evenly and with fair speed through the body, but is hindered from visiting the chilled part while it gathers and is crowded into other parts. That is why sitting with wet stockings and shoes may mean cold feet and a burning, aching red throat, congested with blood.



How the Heart Pumps.

Reprinted by permission from "Engines of the Human Body," by Prof. Sir A. Keith

A sudden, quick, exposure to cold, for a few minutes, or while exercising, ought not to hurt anyone in ordinary health. Indeed, as you know, cold shower baths and sudden, brief changes of temperature are good exercise for the skin. It is the *slow chilling* of *one part* that is likely to do mischief.

Fresh air is the best preventive of colds, a brisk walk on a cold day is a fine tonic; but a small stream of cold air blowing on the back of the neck is another matter. One of the worst colds I ever had was caused by sitting

in this way with the rest of my body warm and a tiny thread of cold air playing on my back. If I had had cold air blowing all around me, I should doubtless have been all right.

The same thing often happens in a sleeping car. Either there is no ventilation and the air is so hot and dry that rapid evaporation makes the skin chilly, or else there is a narrow stream of air pouring through the crack of the window on just one spot.

Many people are so afraid of drafts that they fear open windows and shun a breeze like the plague. Nothing could be sillier. By all means sleep with windows open wide, top and bottom, work and play as much as possible in the open air and "toughen" your skin by cool baths and plenty of exposure to air, so that you will not be affected by changes of temperature. There is no surer way to make yourself "tender" and a ready victim for colds than to shut yourself up in overheated rooms and muffle up in heavy, thick clothing. People who work indoors all day should never wear heavy underwear, but rely on heavy outer wraps to protect them when they go out.

Thus far we have talked about the type of cold that comes from an upset circulation and chilling of some part of the body. The more usual type of cold is

"caught" by one person from another, and is as truly a germ disease as smallpox or typhoid, though it may be due to several different forms of bacteria.

It is supposed that various bacteria can usually be

found in the nose, but do no harm remaining quiet, unless, for one reason or another, the owner of the nose is a little upset and not quite so strong as usual. Then they set to work and make trouble.

For this reason, it is very important to keep free from constipation, which is one of the chief causes paving the way for a cold to develop. In constipation, the poisonous waste matter, instead of being thrown off, passes into the blood and settles in some "weak spot." This often means a cold.

Since most colds are caused by germs, it is clear that anyone with a cold should avoid other people as far as possible and should be especially careful not to cough, sneeze or spit where he can scatter his germs. It is amazing how many people, in a crowded car, will cough,

or sneeze without making any effort to cover the mouth with a handkerchief. The handkerchief should be clean and should *not* be used, as it often is, to dust, polish the boots, etc. And as for spitting, our streets and public places are a national disgrace.

It is, of course, often impossible for a worker to remain at home because of a slight cold, but he can and

ought to protect his fellow workers so far as he can. I wish all workers would do like a young friend of mine. She keeps her own towel and drinking glass at her work place. Thus she protects both herself and others and when she has a cold "keeps her germs to herself."

Some people are nervous for fear a cold may "run

into" tuberculosis. This will not happen unless the patient already has or acquires the germs of tuberculosis. But anyone who lets a cold go with no special care or attention is likely to become so "run down" that he is just ready to give a chance to any germ that happens to come his way.

For a person with a really severe cold, there is just one suitable place and that is his or her bed, in a well-aired, but not draughty room. Rest, hot drinks and a thorough clearing out of the bowels will often "break"

a cold in its early stages. Self-dosing however, is unwise, as what seems a cold may be the beginning of a very different illness. The recent influenza epidemics have taught us all a wholesome respect for the "colds" which we used to consider so unimportant.

Some people, in spite of living according to the best health rules, are constantly troubled with colds. This is often due to some wrong shape or some growth in the nose or throat. Such nose and throat troubles often cause an inflammation to run from the throat, up the tube which leads to the ear, causing deafness or very dangerous disease of the inner ear, close to the brain.

Many people have to work in dusty rooms filled with floating bits of cotton, wool, or other substances. Now, if such workers have infected "pockets" in the nose or throat, due to some stoppage in the passage, they are almost certain to have bad colds, if not something worse. How much wiser it would be if every boy and girl, before starting to work, had a thorough overhauling by a doctor, so that such troubles might be discovered and cured.

COLDS—HOW TO CATCH AND HOW TO AVOID THEM

John Smith walked to work in the rain without overshoes and sat at his desk all day with wet feet. John Brown worked all day in a lumber camp, getting logs into the river, wet to the knees. Explain what happened in John Smith's body to give him a "cold." Show why the same thing did not happen to John Brown.

What does the doctor mean when he speaks of a *congestion* due to exposure to cold or wet?

Show how a daily cold shower or plunge bath might be helpful in warding off colds.

Why is it hurtful to sit in a draft, but very helpful to sleep out doors if properly protected?

Why do colds run through a family or a school? And why will some children *not* "catch" them?

What things can you do to keep *your* germs to yourself and at the same time avoid *other people's*?

If you feel yourself catching cold what is the sensible treatment to give yourself?

What would be the advantage to you of having a thorough physical examination by a good doctor before starting to work?

CLOTHING

"CLOTHES make the man" is true in more senses than one. In the first place, strangers are impressed in our favor or take a dislike to us for very trivial reasons. One of these reasons is our clothing.

I remember once sitting in the waiting room of a busy man who had advertised for a stenographer. Three applicants were in the room when the employer opened the door, gave one glance around, and beckoned one of the girls. A few moments later she was given the position and the others, disappointed, left.

When I asked this gentleman how he had been able to pick out the right girl so quickly, he smiled and said, "I looked at three things, her shoes, her hair and her dress. The girls in my office must be sensible, neat and refined. Now of the three girls who applied for this position, one was wearing high-heeled patent-leather pumps and thin silk stockings, without rubbers. It was a snowy, February day, but she had bought a spring hat with the money that should have gone for rubbers to keep her from being ill. I decided that she had not sense enough to be my stenographer.

"The second girl had on what was once her best dress, but was now soiled. It was entirely too fussy a dress for office wear. Her hair was done in an enormous bun over each ear and a mass of frizzes on top. Her dotted veil was broken just over her nose, which poked through, giving a very odd effect. I knew, at a glance, that she

was neither tidy nor refined, for a really ladylike girl doesn't wear fussy clothes, or do her hair in a ball-room style when she is at work.

"The third girl wore old, but well-blacked shoes with low heels, on which she could stand a long time without

tiring. Her plain brown suit was also rather old, but it fitted prettily, and was perfectly clean. So was the shirtwaist that showed beneath it.

"Her hair—for I asked her to take off her hat while I dictated to her—was simply, but very becomingly arranged. It looked like a *head,* not like an outlandish

sort of bird's-nest, such as some girls seem to admire.

"So I judged that she was a sensible, neat, nice girl, with good taste and good manners, and that is just as important to me as to have a girl that can take fast dictation."

If everyone who went hunting work could only realize how much difference clothes—not expensive clothes, but neat, suitable clothes—make!

And as clothes make a difference in getting work, so also they make a difference in keeping it. Of course not many people are actually discharged because they dress untidily, but many lose their work because their clothing does not help to keep them in the best of health.

I have spoken already about the bad effects of wrong shoes. Every worker should also realize that his work suffers from any article of clothing that binds or cramps him. For instance, I have known boys to wear their belts so tight that it really injured them.

"Round" garters press on the large blood vessels under the knee and are bad for the circulation. Corsets, unless worn very loose, prevent the chest from expanding so that the lungs can fill with air. Shoes laced too tightly check the blood supply to the feet and make the feet cold.

Our ideal should be to wear clothing as well-fitting, comfortable, suitable and beautiful as the fur and feathers that the other animals are so kindly provided with.

One cannot lay down hard and fast rules for another. Some people require more clothing than others, but everyone should beware of dressing too heavily indoors. The skin needs air.

Another thing to remember is that the weight of the garments should hang from the shoulder, at the place where it joins the neck. If you ever saw a Dutch milk-maid, you know that the wooden yoke to which the pails are hung, fits snugly over her shoulders, so that the weight falls on this strongest part of the shoulder.

If the pull of the garment, or of the suspenders, does not come in the right place, the shoulders may be pulled forward so that they become rounded. So try to buy suspenders that are free from this fault.

As we said before, no one can make absolute rules for another, but most people find cotton underwear much more satisfactory than wool. Cotton does not shrink when washed. It absorbs perspiration. It does not "scratch" the skin as wool does. It can be easily washed and dries quickly.

The last advantage is a great one, for underwear absorbs the perspiration and with it all the oil and waste from the skin, so that two fresh suits of underwear a

week are not too many for anyone. If one is perspiring very much, either from one's work or because of the weather, he really should change his underwear every day. With thin cotton things, this is easily done. Any

girl or boy can rinse out his or her undervest at night and put it on clean and dry in the morning. Every night the clothes should be well aired.

I suppose those who have never worked in a factory do not realize that unsuitable clothes are not merely foolish but actually dangerous. If you talk with any

foreman whose factory has big fly-wheels and other open machinery, he will tell you of many an accident due to clothing. Sometimes it is a pair of high heels that suddenly turn the ankle of their wearer and throw her against the moving machinery. Sometimes it is a flowing sleeve, the ripped and hanging ruffle from a skirt, or a flying apron string that catches in the moving belt or wheel and causes a terrible accident.

In many factories and machine shops, the workers are all warned to wear no flowing ends to their clothing, and the girls all wear caps, so that their hair may be safe.

In other places, where poisonous materials are handled, the management provides the workers with wash suits which are washed and changed frequently. It is very dangerous to wear day after day a suit that is full of particles of poisonous dust.

Of course every natural human being wants to wear clothes that he thinks pretty or becoming. I have read that the Fuegian natives paint their bodies red and yellow as a sign of friendship, white in time of war, and wear black paint just as we wear mourning. Doubtless their paint seems as beautiful to them as an artistic gown does to us.

If you travel through Europe, you will find that the peasants of one province wear one costume, all on the same pattern and the peasants of another province wear another. Among people who have travelled and seen the world, it is no longer the custom for everyone to wear the same costume—each one follows his own taste. As the years go by people are getting to realize, more and more, how silly it is for everyone to wear the same style clothes,

and you find women, and even men, wearing whatever they think most pretty and becoming. "Style" is no longer a hard and fixed thing that everyone must follow.

"Clothes make the man," but we can so choose our clothes that they shall make us healthy, attractive and ready to work easily and well.

CLOTHING

Tomorrow, watch the people you see going to and coming from work. Describe a girl and a boy you have seen who were unsuitably clad for work downtown. Describe the costume of a boy and a girl suitably dressed for work.

Make out a shopping list for yourself of clothes you would need, to be well dressed for work in all weather.

Make a list of some ways in which our clothes might interfere with our health, because of fit or cut. What better forms of clothing could be used in place of the faulty garments?

Make a table comparing cotton and wool as material for undergarments.

What care must be taken of undergarments, to keep the owner fresh and neat?

If you were going to work in a factory what chance of accident might you run through badly selected clothes? How do some companies try to protect their employees and themselves from such accidents?

Get some very old magazines if you can. Get also, some illustrated history books and examine the clothes of the people shown. Do you think any of these clothes are beautiful? Stylish? What, then, do you think beauty is? Style?

Why do we think Nature's costumes for birds and animals beautiful?

How could you increase the beauty of your own costume without spending more money? What would you need instead of elaborate or expensive materials?

Go downtown, and from the shop windows, select a costume suitable for a girl's every day wear, which is beautiful, durable and appropriate and within a price reasonably agreed upon. Describe it to your companions and discuss with them your judgment.

Of what value is it to you to be able to choose suitable clothes for yourself?

"CATCHING" DISEASES

In talking about colds, I said that they were usually "caught" from another person and were due to germs. Most people have a very vague idea about germs and how they travel, the popular opinion seeming to be that they float around in the air and are breathed by some unfortunate person, who immediately falls ill.

The truth is that the seeds of disease which we call "germs" do sometimes float a short distance in the air, especially in such work-rooms as are filled with dust and floating bits of wood or lint on which the germs can ride, as it were.

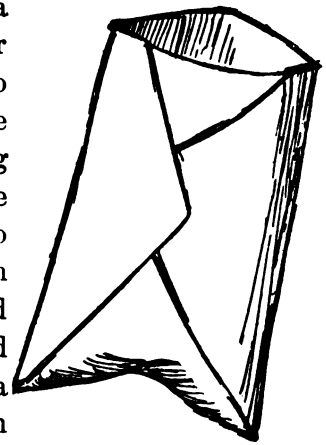
Usually, however, germs travel in one of three ways. They are very often "handed on" directly from one person to another. This happens when you give the baby your sore throat by kissing her. Some of the germs from your mouth are transferred to hers. Or perhaps you drink from a cup that has just been used by someone who is coming down with diphtheria, and who has left some germs on the edge of the cup. Maybe you wipe your mouth with the towel where a consumptive has left the germs of tuberculosis, from his mouth.

If you stop to think of it, we are all constantly wetting things with our saliva. We lick postage stamps. Many people wet their thumbs when they turn pages of

a book. We keep putting our fingers to our mouths and nostrils and then handling all sorts of objects that others handle after us, such as door-knobs, faucets, stair-rails, car-straps, counters and desks. In this way, germs from diseased mouths and noses continually pass to other mouths and noses.

What can we do about it? One thing that we can do is to break ourselves of the habit of putting our hands near our mouths and noses. A doctor once told me that if children could be taught to keep their hands away from their noses and mouths, at least half of their illnesses would be avoided.

Another thing that we can do is never to use a public towel. Every worker should, if paper towels are not provided, carry his own towel from home. It is better to wipe your hands on a clean handkerchief, or even to wave them about until they dry, than to risk catching the germ of some serious disease by using a public towel.



I remember once sitting in a railroad station for half an hour and watching the people who drank from a common cup. There was one young man with a racking cough, another with horrible sores on his lips, and a third who drank and drank as if he were in a fever, and from his flushed cheeks I imagine he was. And right after these people came a beautiful girl who drank and then put the cup to the lips of her baby brother.

When travelling I always carry a few paper cups, or even make a passable sort of cup by sealing a clean envelope and then cutting off one end. You will find that you can drink from it very well. But it is far better to go thirsty than to use a common cup or glass.

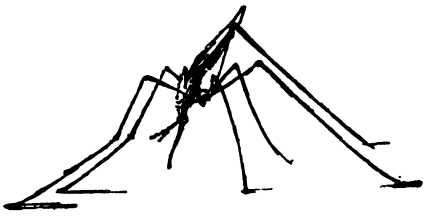
Germs, besides travelling by means of kisses, coughs, sneezes and *via* towels, handkerchiefs, cups, hands, and so forth, travel in food, milk and water.

Food sometimes gathers germs from a dirty cook or waitress who does not wash her hands, or from a careless person who eats with unwashed hands. Often, too, germs are carried on the feet of flies, which travel from

RESTAURANT
AND
LUNCH
ROOM

every sort of filth straight to the bakery, grocery, kitchen and restaurant.

Milk sometimes comes from diseased cattle, but it is more likely to get germs through careless handling during its journey from the cow to you. Milkers are often dirty and careless. Milk cans are not always clean and milk that is sold "loose" from an open can in the grocery or milk store has a good chance to catch all sorts of dust and germs.



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Nowadays, when food is so expensive, some people may say that they cannot afford to be fussy. But it is not "fussy" to demand clean food, since unclean food is actually *dangerous.*

And really, it is quite possible to find a cheap, but clean grocery and meat market, and cheap restaurants where the flies are kept out, the dishes and glasses are clean and the waiters are reasonably neat. Besides, it is certainly cheaper to pay five cents more for your luncheon than to fall ill of typhoid or some other disease that comes from eating germs from other people's bodies. Put in that way, it sounds rather disgusting, but it *is* disgusting, and we should all be so disgusted that we would refuse to do it!

A third way in which germs travel is in the bodies of certain insects and animals.

Malaria, which used to be blamed on "night air," is, as we now know, caused by a germ which travels in

the bodies of certain kinds of mosquitoes. Yellow fever travels in the same way, through another sort of mosquito. The germ is in the blood of a fever patient. The mosquito, biting the sufferer, sucks in the germ with the blood. Later, the same mosquito bites someone else and plants the germ in the wound.

The plague is carried in the same way by the bite of fleas from rats, and typhus fever by the bite of the body louse. You may have read how the typhus raged in Serbia until the Red Cross bathed the whole population and so rid them of vermin and stamped out the typhus.

In this whole matter of catching diseases, every worker has two duties—to protect himself and to protect others.

It would be a good plan if every work-room would post up a set of rules something like this:

PROTECT YOURSELF

by

Using your own glass, soap and towel
Keeping hands away from your mouth and nose
Washing hands after going to toilet and *always before eating*

PROTECT OTHERS

by

Sneezing, coughing and spitting only into your handkerchief
Obeying quarantine laws
Being cleanly in all your habits

If every worker would bear in mind these few rules,

our work-rooms and factories would be much healthier, happier places.

CATCHING DISEASES

Make a list of all the ways by which germs can travel from person to person. Which of these ways have you seen in school? In places where people are at work? At home? When travelling? What habits have you which expose you to germs in any of these ways? What habits have you which expose others to your germs?

How could a careless cook let germs get into good food? What changes in her habits should she make?

Why are flies the worst source of danger to food? What ways have we of preventing their destructiveness?

Find out what care is taken of milk known as "certified?" Why are these precautions thought necessary? What care of milk do you take after it enters your home?

How will you judge if the restaurant where you eat your lunch, is clean? What do you expect of a "clean" restaurant, as to food, service, surroundings?

Why did the government have to spend millions of dollars getting rid of all mosquitoes, before it could build the Panama Canal?

How did the Red Cross check the spread of typhus fever in Serbia? Why was this method effective?

For what health reasons should we destroy rats and mice?

State the rules for protecting yourself and others, given in this chapter. Try to state *why* each is given to you.

THE DUPLESSIS PORTRAIT OF FRANKLIN

"At my first admission into the printing house,—I drank only water; the other men, near fifty in number, were great drinkers of beer. On one occasion I carried up and down stairs a large form of types in each hand, while others carried but one form in both hands. They wondered at this and several instances, that the Water American, as they called me, was stronger than themselves who drank beer."

Benjamin Franklin's Autobiography.

ALCOHOL AND TOBACCO

At one time, I lived next door to a large railroad yard. My window looked right out on the tracks, and I often watched the train hands going to and fro about their work.

I became so interested in them that I was very sorry when a saloon was opened, close by the yard gate, where the men had to pass in coming to and from their work. "Now a lot of the men will be getting drunk," I said, "and that will mean not only trouble for them, but for their families, and perhaps some serious railroad accidents."

The man to whom I said this was a clerk in the office of the railroad. He shook his head vigorously. "No they won't," he answered. "They all know that it is a rule of our railroad that any man found drinking is 'fired' on the spot. You see, railroading is too ticklish a business for *half-men* to be trusted, and a man who drinks is only a half-man. His hand is unsteady, his eyes and ears are dulled, his brain is half-awake. Such a man can't be trusted to test brakes and wheels, to oil or to water the engine properly. Much less can he be trusted to serve as engineer. He might fail to see a danger signal and wreck a whole trainfull of people. No, indeed, the railroad stopped several years ago hiring men who love liquor better than their job."

I often thought of that conversation afterward, especially when the war came and brought prohibition with it. The war made it clear, once for all, that "half-men" cannot be successful soldiers. For years, scientists had

been experimenting and students had been digging up statistics, to show what alcohol does to men and women.

They had proved that it weakens the heart. They had shown that it hardens the tissues of the body. They had demonstrated that it makes the whole body less able to resist the germs of disease, that it weakens the memory, power of attention and general control of the muscles and nerves. They had proved these things for anyone who was willing to read and listen.

And, as I have said, many employers of large numbers of men had made it a rule not to hire those who drank, because they did poor work and often caused accidents, for which the employer was obliged, by law, to pay.

But it was the war that suddenly brought every sane man face to face with these facts. If we wanted to win the war, we must have *whole* men, not *half-men,* not men who were only fifty per cent. efficient.

And so the constitutional amendment was passed, because, if the nation needed the best possible soldiers to win the war, she also needed the best possible men in the time of peace. She needs men whose bodies are strong, whose nerves are steady, whose brains are keen and alert.

It is too soon yet to quote figures as to the good that has come from this banishing of alcohol, but indications from all over the country seem to show that people are healthier, richer, happier, that there are less crimes and fewer accidents.

In the beginning, there was a good deal of silly talk, which the brewers and saloon keepers kept repeating,

about the unwillingness of men to work without liquor. It was said that the workers would "walk out" in a body and that no work would be done. "No beer, no work," was the motto which the liquor dealers adopted. But so far from the workers striking, because they had no beer, they went quietly on, as if nothing had happened. The saloons have been turned into restaurants or shops, and the money that used to be spent on liquor to make men poorer workers is going for things which will make them stronger, happier, and better workers.

Of course, you will always meet people who insist that if a man wants to injure his health he has a *right* to do so. But these people forget that a man's children have a *right* to a decent father, who will support them, and that the city which gives a man police and fire protection, lighted streets, pure water, free libraries, and countless other privileges, has a *right* to sober, decent, public-spirited citizens.

Just as every soldier felt it his duty to be as strong, healthy and fit as possible, that he might help to win the war and save the world from German militarism, so every worker must realize that it is his duty to be as healthy as possible, so that he may be a useful, productive citizen—a soldier, not a slacker, in the army of progress and industry.

The tobacco problem is one on which people are not yet so well informed or so convinced as on the alcohol question. Yet a very little reading and thought on the subject will convince anyone—that is, anyone who has not already made up his mind—that tobacco is an enemy to good work.

Of course, tobacco is not so immediately dangerous as alcohol, but, like alcohol, it is one of the things that dull a man's tools and injure him as a worker and a thinker.

Tobacco and tobacco smoke contain powerful poisons. The deadliest of these is nicotin, two drops of which on the tongue of a dog will kill him.

Of course some poisons, such as arsenic and laudanum, may be useful as medicine, under the doctor's orders, but tobacco has never been listed among these medical poisons, and no doctor prescribes it. It is clear that it does no good to the smoker, except for the pleasure he may get from it.

Now what does the smoker pay for this pleasure? Apart from the money he pays, which is often a great deal more than he can afford, he pays in both bodily and mental strength.

Tobacco affects the heart, making it beat weakly and irregularly. It weakens the lungs. The smoke irritates the throat and makes it sore and this may extend to the ear and affect the hearing. It stains the teeth. It weakens the nerves. It upsets the stomach. It acts on your body machinery as a handful of sand might act on a dynamo—it throws it "out of gear" pretty completely.

Of course anyone can, at once, point to two or three men of his acquaintance who smoke, and seem to be in fair health. Probably these men are naturally very strong, but there is no telling how much stronger they might be without tobacco. And certainly no one can point to an invalid who was made strong by smoking, whereas we all know many who have been injured by it.

Besides, the way to prove anything is not by separate cases, but by a large number of cases, where one can arrive at an average.

This was done by a Professor Pack, who compared, in six colleges and schools, the students who tried to get on the football team. There were 210 students who competed for the honor, of whom ninety-three smoked and 117 did not. Of the 210 students, 110 were chosen—thirty-one being smokers and seventy-nine non-smokers. In other words, among the smokers, two thirds failed, and among the non-smokers, more than two thirds succeeded!

The same thing is evident when we consider not strength of body, but strength and alertness of mind. If a number of smokers are compared with a number of non-smokers, the smokers always show poorer marks in their studies, as one would naturally expect, since the body and the mind must work together.

Many employers realize so fully the bad effects of tobacco, especially on young people, that they will not employ a boy who smokes, and it is a very common rule that employees shall not smoke during working hours. Many a boy has failed to "land" a job because of the tell-tale stains on his fingers. Many a boy has lost his place because he weakened himself with cigarettes.

Alcohol and tobacco are enemies to the worker, because they dull or destroy the tools which Nature has given him to earn his living. They are enemies to society because they rob the world of useful, capable men. They are enemies to America, because they would make her a nation of weaklings, instead of a nation of sturdy heroes.

ALCOHOL AND TOBACCO

Even before prohibition, how did most of the great railroads show their belief in the harmfulness of alcohol?

Science has proven that alcohol harms us in five ways. Name them.

What does your chapter mean by a "half-man?" What positions can you name in which such "half-men" would be dangerous?

Discuss the rights of a man to drink compared with the rights of his children, his city and his employers to have him sober. Which rights do you think are stronger?

How does the use of alcohol interfere with a man's performance of his duty as a soldier? A good citizen?

This chapter describes the injury done to six parts of your body by the use of tobacco in youth. How does it injure each of these parts?

Use Professor Pack's figures on smokers and non-smokers trying for a foot-ball team. With them, make a talk that will convince a boy that smoking is injurious to him. Find out from the nearest big athletic team what the "training" rules are, as to tobacco and alcohol.

Is smoking ever a hindrance in getting a good job?

Make a poster showing how alcohol and tobacco are enemies. What three reasons will you put on it?

TAKING CHANCES AND TAKING CONSEQUENCES

It is not surprising that, as we said in the last chapter, men who are only half-men, because they are weakened by stimulants and narcotics, should meet with accidents. But it *is* surprising that men who are entirely sober and in possession of their full senses should meet with as many accidents as they do.

In the one year of 1916, the estimated accidents, not on the streets, but in the shops, factories, mines, etc. of the United States, amounted to 3,000,000—which means about 10,000 on every working day.

It was further estimated that these accidents caused a time loss of 105,000,000 days. If we count 300 working days to a year, this makes a loss of 350,000 years! As for the wages lost, they would amount to $210,000,000.

But not merely time and money were lost, for in one year's accidents, 20,000 men lost their lives. How many homes wrecked! How many families of children left fatherless, for the community to support!

And the most amazing thing about this awful waste of time, money, life and happiness, is that most of it is quite unnecessary, because most of it is due to someone's "taking a chance." There are accidents that could not have been foreseen or avoided, but most accidents are due to sheer carelessness. The careless person, however, is very often not the one to suffer.

Some years ago, a certain firm of contractors in

Massachusetts set to work to reduce the number of accidents among their men. The machinery, etc., was made as safe as possible, and the men were, in one way and another, urged to be careful, and not to "take chances."

In the year 1915, there were 399 accidents for every 1000 employees—only those accidents being counted that were serious enough to make the men lose time from work.

The next year, there were 303 accidents for every thousand men.

The next year after that, the men had gotten into the careful habit, and there were only 180 accidents for every thousand men.

A little figuring will show you that in two years, the accidents had been cut to less than half! Think what a saving to the firm, to the workers, and to their families! A saving to the nation too, for America needs all the able-bodied workers that she can get.

Of course there are different dangers in each trade or sort of work, but there are certain safety habits that every beginner at any sort of work should form at once.

One of these habits is to make use of every safety device the management provides. Firms don't pay for safety masks, goggles, protectors, etc., just for fun. They buy them in order to protect the men's lives and in order to protect themselves from having to pay damages to injured men. They would not buy them unless they

were needed and any worker who refuses to use these protections is not only risking his own life, but risking his employer's money and often risking the safety of all those who work with him. Therefore the first safety habit is the habit of *using* all *the protections provided by the employer.*

The second habit is that of *absolute obedience to rules.* Rules are made for the safety and welfare of all. In factories where paper and other inflammable material is stored, or where there is turpentine or paint, or explosives, such as gasoline, there is always a strict rule against smoking. Many a factory has been destroyed and many lives sacrificed, because some employee thought he could break this rule and "get away with it."

In many places there are rules about touching moving machinery and other rules against employees handling machines of which they are not in charge.

I have a friend who works in a great shipyard. She told me one day that a boy of sixteen, a new worker, had been killed. He had gone into a part of the yard where he had no business and where he was forbidden to go and had stood close to where a great boom swung around. There was a sign warning him to keep away, and someone shouted to him, but it was too late. He had broken a

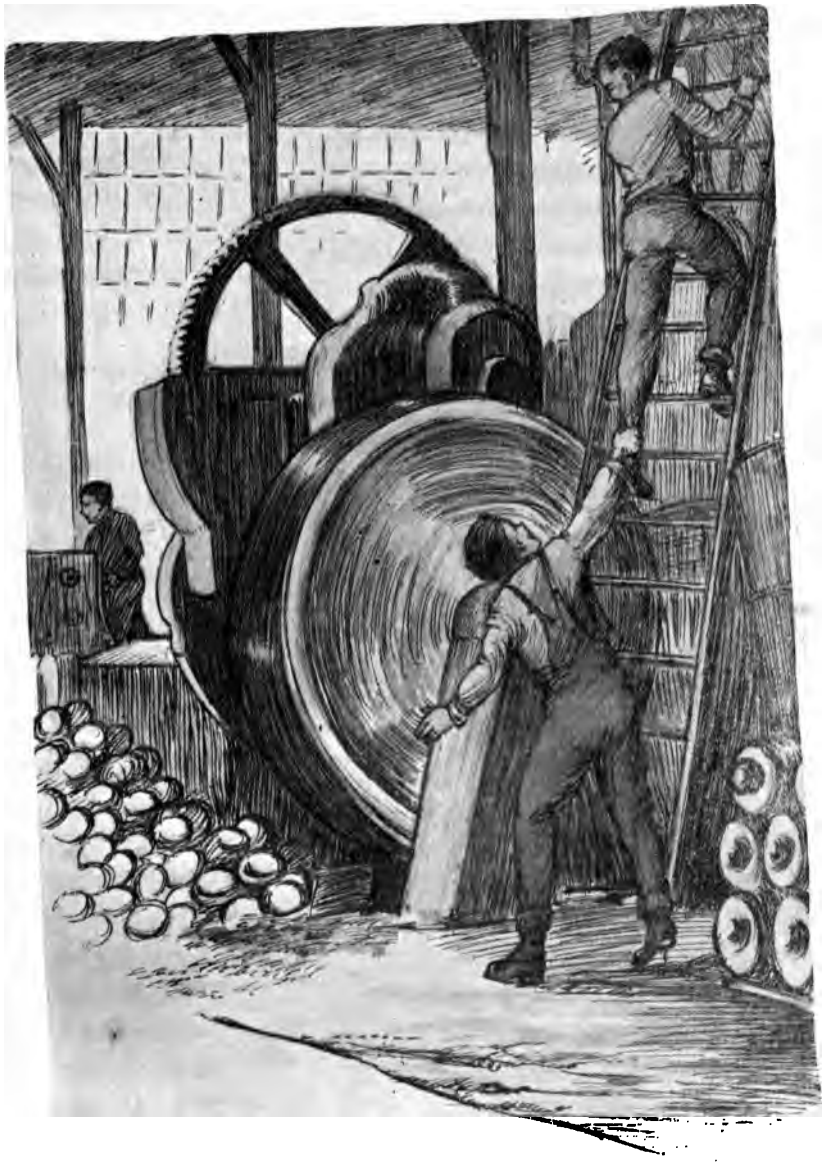
rule in order to gratify his curiosity, and he paid a terrible penalty.

His poor mother blamed "that awful shipyard," but really the whole blame lay with the boy who disobeyed a rule that was made solely to protect him.

A third safety habit is *orderliness.* A great many workers have a way of laying tools and materials down

wherever they happen to be, and then going off and forgetting them. If everyone does this, it means that an enormous amount of litter accumulates, which furnishes excellent material for a fire, especially if oily rags or overalls are left about. Moreover, if hammers, boards, tool-boxes, etc., are left in halls and passage-ways between machines, they offer obstacles over which the unwary passer is liable to stumble and a stumble against a machine may mean death! Oil carelessly dripped on the floor may cause a fall. Nails may pierce someone's foot, and in case of fire, every object that blocks the way for even an instant is an added danger.

The fourth habit that every young worker should form is that of *removing every source of danger* where he can, and *reporting it,* where he cannot remove it. By this I mean that everyone, as a loyal member of his work-community, should make it his business to pound down protruding nails, pick up broken glass, and generally clear away any small, but dangerous material.



Where he finds a fire-escape door locked, a scaffold unsafe, or a machine defective, he should *at once* report it to someone in charge. Everyone on the force should unite in doing this for the safety of all.

Finally, I would urge every young worker to know when and where to indulge his high spirits and not to start "rough-housing" among machines, on high places, with sharp implements, or under any circumstances where the

Foreign body in eye (removal).

Foreign body in eye (removal).

play may suddenly end in tragedy. Be as cheerful and jolly as you can, while you work, but *save your "fooling" for the noon hour and do it in a safe place.*

In most large stores and factories, there is a nurse or doctor to see to anyone who is hurt. If you should work where there is no nurse or doctor, it will be well for you to keep in your drawer or locker a few simple remedies and know how to use them.

For slight cuts, use a ten per cent. solution of iodine and cover with a piece of *clean* gauze or cloth. If the cut is severe, get a doctor.

For a fainting fit, loosen the clothing, lay the person

flat on his or her back, give plenty of air and, if the person does not quickly "come to," give one half teaspoonful of aromatic spirits of ammonia in one half glass of water, and send for a doctor.

For a raw or blistered burn, coat with oil—either machine, linseed, olive, or vaseline, and cover with *clean* cloth. If the burn is serious get a doctor.

Hand tourniquet to control severe bleeding.

These are just a few of the simple things that any worker can and should do for his fellow workers, or for himself in case of a slight accident. A serious accident always needs a doctor at the earliest possible moment. Therefore it is well to find out the address of the doctor nearest to your work-place, unless the firm employs a physician.

But every young worker, and every old one, if he has not yet done so, should resolve that no accident shall ever be due to his carelessness. The habit of being careful will make him and his fellow workmen safe. A careless worker is never really trusted, and when a fore-

man is chosen, he is selected from among the careful, trustworthy men.

"It's better to be safe than to be sorry," and another good motto for the worker is, "If you take a chance, others may have to take the consequences."

TAKING CHANCES AND TAKING CONSEQUENCES

Repeat the 1916 U. S. accident statistics. What do they mean to you? What are some causes of these accidents? Which is the commonest cause?

Write the statistics of the Massachusetts company on a piece of paper. Make a chart to show more clearly what this means. Six inches apart, draw three horizontal lines twenty inches long, each inch corresponding to fifty men. (Why to fifty?) To the left of the first line, write 1915. Measure to the right, on this line the correct number of inches to represent the 399 men injured that year. (How will you find the length of line?) Color the line red. Do the same for the years 1916-17, 1918. Make a title for your chart telling what it proves.

List five safety habits which you, as a worker, ought to acquire. Show why the second and third are of very great importance to you.

What articles would you want in a first aid box to keep near you at your work. How would you use each? Have you practiced so you can handle your materials skillfully?

Recite two good safety-first mottoes.

THE CARE OF THE BABY

It is, of course, impossible within the covers of one book like this, to speak of all the different sorts of work which a boy or girl may take up. But there is one sort of work so important and about which it is so necessary for everyone to know something, that a few pages must be devoted to it.

Whatever sort of work you do or don't do, it is probable that some day you will have to take care of children. Fifteen out of every sixteen American girls marry, and before they do so they should know at least something about caring for babies and little children, for the business of being a parent is the most important in the world and probably the most neglected.

I have a friend who is planning to move into the country and raise bees. She is buying every book she can find that tells how best to care for bees, and she buttonholes every farmer she meets to ask him whether he keeps bees and can give her any advice.

Another friend of mine, when her first baby came, was offered a book on the care of babies; but she said, "Oh, I think mothers know how to bring up babies better than any old doctors can. I can take care of my baby without any advice."

When babies are so much more precious than bees, isn't it strange that one woman should take so much pains to prepare herself for being a successful bee-raiser, while another should take no pains at all to learn how to rear strong, good babies?

The fact is that, if we ever did have any instinct about taking care of our babies, such as the animals have about caring for theirs, civilization has trained it out of us. We need to be taught the business of parenthood just as we need to be taught any other trade.

Probably the thing that chiefly affects the baby's health is his food. Little babies should always, if possible, be nursed by their mothers; it gives them five times as many chances to live as if they were fed on the bottle. However, this is not always possible, and in that case one should consult a good doctor and get exact directions for preparing the milk—"modifying" it, as the doctors say, to suit the baby's needs. What suits your neighbor's baby, may be the death of yours.

Having learned how to modify the milk, it is necessary to keep the bottles absolutely clean. After use, they should be rinsed in cold water, scrubbed with hot soapsuds, rinsed again and then boiled for fifteen minutes. This will kill any germs that may be lurking in them. The rubber tops should be rinsed in cold water, rubbed with salt inside and out, boiled five minutes and then kept in a clean, covered jar until they are used again. This may seem a lot of trouble, but it isn't half so much trouble or worry as having a sick baby.

When the baby is about a year old and his tiny white teeth begin to prick through the gums, many parents make the mistake of thinking he is ready for regular, grownup food, and give him a taste of everything on the table. This is certain to ruin his digestion, for his stomach can only *gradually* learn to make use of solid food. He still needs plenty of milk, but should be given cereals very

thoroughy cooked and strained through a sieve, green vegetables such as peas and spinach mashed and strained, the juice of oranges, the mashed pulp of prunes, soft eggs, a well mashed baked potato. One by one, these things

The proper paraphernalia for bottle feeding.

should be added to Master Baby's menu, but do not start him on all sorts of solid foods at once. All his food should be very thoroughly mashed, as he has not yet learned to chew well. To give him practice in chewing, and to strengthen his teeth, let him have a hard bread-crust or

a bone, but never give him a lump of food expecting him to chew it up.

A baby that has been sensibly fed is likely to grow into a sturdy, happy child; while one that has been given "just a taste" of whatever the grown folks are eating, will become pale, fretful, and liable, later in life, to develop serious stomach trouble.

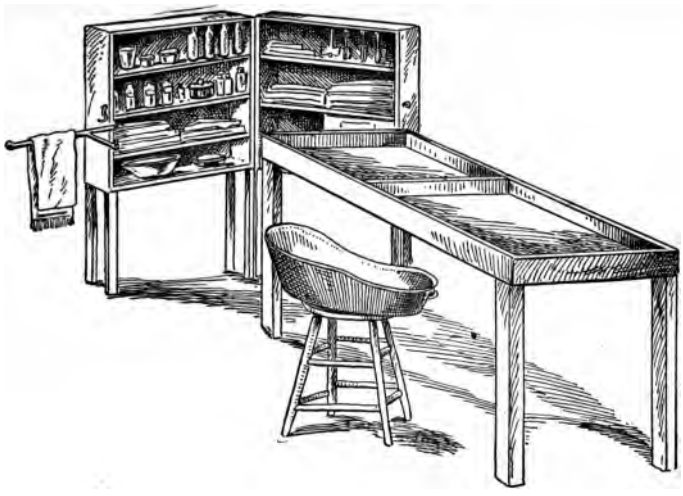
Another vitally important thing is that the baby shall have plenty of sleep. For the first six months of his life, he should sleep about eighteen hours out of the twenty-four. During the next six months, he needs sixteen hours sleep, and until he is four years old he should sleep fourteen hours. This means that if a four-year old gets up at seven o'clock, he should take an hour's nap in the afternoon and go to bed at six o'clock.

Most babies and little children do not get anywhere near so much sleep as they need, and the reason is that their parents do not realize how necessary sleep is. Grown people need sleep, but children need far more, since it is during their sleep that their little bodies grow. Put the baby to bed at a regular hour every day and he will soon form the habit of dropping off at once into a peaceful sleep.

We have already talked about what fresh air does for health. Some people, however, seem to think that babies do not require so much fresh air as we older folks. Nothing could be more mistaken. In fair, warm weather, the baby should be outdoors all day if possible. In cold, raw weather, he can at least, protected with cap and coat, play in a room with the windows wide open. If fewer babies spent the evening in hot, stuffy moving picture

houses, and more were put to bed on a porch or balcony, we should have fewer sickly, weak-lunged grownups.

And just as the baby's lungs need fresh, clean air, so his body needs plenty of clean water, inside and out. Be sure to give him cool, boiled water to drink and a good bath every day.



A B

A.—Infant's dressing screen. Holds all required articles and protects table.
B.—Infant's dressing table. One half for bath and change; one half for use after infant has been bathed and dried.

But be sure that you bathe the baby at the right time, in the right place and the right way. The right time is before, not after he is fed, and not just before he is going outdoors. Bathing just after eating is likely to cause indigestion, and bathing before going out makes him more liable to catch cold.

The right place to bathe the baby is in a warm room, where there is no draft from doors or windows. Use a screen if necessary.

The right way is with clean, warm water. Don't test the water by the old rule that if the baby turns red, the water is too hot, and if he turns blue, it is too cold. Bath thermometers do not cost much and are very useful. For babies under six months old, water from ninety-five to ninety-eight degrees Fahrenheit is about right. For older babies, the water may be gradually cooled until it is as low as ninety degrees.

Use only pure, white soap, such as ivory or castile, and do not let anyone else ever use the baby's wash cloth and towel. Sponges are good for washing automobiles, but not babies. It is impossible to get a sponge really clean without boiling it, and as you know, boiling means goodbye to the sponge!

Having bathed the baby, the next step is to dress him. If Master Baby could speak, I think he would say something like this:

THE BABY'S PLEA

"Fine feathers make fine birds," they say,
We babies—just the other way—
Know youngsters dressed in fancy clothes,
All frills and lace and furbelows,
Whose mothers rig them up like toys,
Don't make the strongest girls and boys.

"Clothes make the man." It's also true
That clothing makes the baby too,
So listen to the Baby's plea
And dress him as he wants to be.

Few, simple garments, warm but light,
Soft, dry and clean and never tight,
Cut in one piece and without bands,
Fashioned by Mother's loving hands,
No bunchy wrinkles round the waist,
Exactly suit a baby's taste.

For our one object, you must know,
Is just to kick and stretch and grow.
In the cold days of snow and storm,
Of course we must be snug and warm,
But how would you, do you suppose,
Like heavy, bulky, bunchy clothes,
That overload you, truss and bind you,
Till 'neath the mass 'tis hard to find you?

When August weather is at hand,
A diaper and knitted band
Are all the rage in Babyland,
For Baby—and I'm sure he's right—
Likes such a costume, cool and light,
Better than any "Frenchy" gown
Bought at the smartest shop in town.

"Fine feathers make fine birds?" Well maybe!
But then, a bird is not a baby!

THE CARE OF THE BABY

What are some reasons why girls, and boys too, should know some things about how to care for babies and young children?

In some schools in this country, the girls in the upper grades have a "Little Mothers' Club." They enjoy this very much, for they have a life-sized babydoll—with crib, tub, clothes and all the things a real baby would

need—and a trained nurse to teach them how to dress and bathe and feed and tend the baby. In one school the boys were so interested that they earned the money to buy the materials for the girls' club. Here are the questions they learned to answer. Try them. It would be more interesting if you could learn the answers by having a club and practicing these things, than by reading. But answer anyway.

Why do you modify milk for a little baby? Where will you learn to do this? What is the very best food for a little baby?

Try cleaning a milk bottle according to the directions in this book. Why must you do each thing described?

How would you feed a year-old baby? What reasons can you give for what you say? Why would you give him a bone or a hard crust rather than a lump of food? Do you think it kind to the baby to give him tastes of all the kinds of food you eat?

How can you tell whether a boy or girl has been sensibly fed, when a baby? Is it worth the trouble to be very careful about the baby's food?

Why do children need rest? How much sleep does a baby need at six months? At one year? At four years? How much sleep does *your* age call for? What are some reasons why children often do not get enough sleep?

How much fresh air does a baby need? How shall the baby get his fresh air in bad weather? What do you think of taking babies to the "movies?"

How much water should a baby have to drink? What precautions should you take about this water?

Can you tell how you would bathe a baby? What is the right time? What is the right place? What is the right way? Would you want to use special materials for a baby's bath? Just what kinds?

Describe what you would call a well-dressed baby? Go to some store selling children's clothes and pick out in your mind, the most comfortable, as well as the prettiest and least expensive babies' outfit. How many of these things could you make?

Go to a baby clinic with your teacher or some other interested person. See how the doctors and nurses weigh the babies and care for them afterwards.

Find out all you can about "Infant Welfare" work done in your community. Becoming interested in this, is one way you can help make all babies happier. Why?

THE OWNER OF THE TOOL CHEST

THE best set of tools in the world are after all only *tools*—they will not create anything useful or beautiful unless their owner knows how to make use of them.

I have a friend who, with an old jack-knife, can make the most exquisite and delicate carvings, while his brother, with a complete set of perfect tools, can only hack and destroy his material. I know a household where an expensive and beautiful piano is banged upon by the children, to the distress of all the neighbors, and I know a woman in another home who can draw the sweetest music from an old piano with three "dead" keys.

Good tools are a great help to any worker, but after all, it isn't the tools, but the *man back of the tools* that counts.

And so, before writing "Finis" to this book, I want you to think for a few moments about how you are going to *use* these wonderful tool-chests, so that you may work easily, happily and usefully—so that you may make something useful and beautiful of your life, and not, as so many do, "make a mess of it," because you do not know how to use your tools.

Suppose we look at some of the great workers of the world and see what were the special qualities which made them *masters* of their bodies—able to use their bodily tools to the best advantage.

Probably no man—certainly no American—of his time was more widely popular than Theodore Roosevelt.

He started life with a very poor "tool-chest," for he was a frail, sickly boy, with bad eyesight and shaky nerves. But the *boy behind the tools* had four characteristics which seem to me the four great essentials for successful work—he had a sunny, cheerful spirit, a love of thoroughness, a willingness to work with others, and an unshakable will.

When his father explained to little Theodore that he could never be a strong man unless he lived outdoors, exercised systematically, and, in general, did everything possible to obey the laws of health, the boy did not fret, or rebel, or waste time being sorry for himself. He cheerfully set to work to *be strong,* and we all know what a strong, courageous, worth-while man the sickly, nervous boy made of himself.

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THEODORE ROOSEVELT

Throughout his hardworking life, Roosevelt, who had built himself a fine "tool-chest," used it hard and well. And he used it so successfully because he had the four *working* virtues which I have mentioned.

His fun-loving spirit kept him well, lightened his many cares and made his work easier. His passion for thorough work made him do well everything he undertook. His willingness to work with others made him a host of friends. His strong will led him to put through tasks that other men would have given up in despair. It was the man *behind the tools* that counted.

Or think of the famous actress, Sarah Bernhardt. When long past the age at which most women are glad

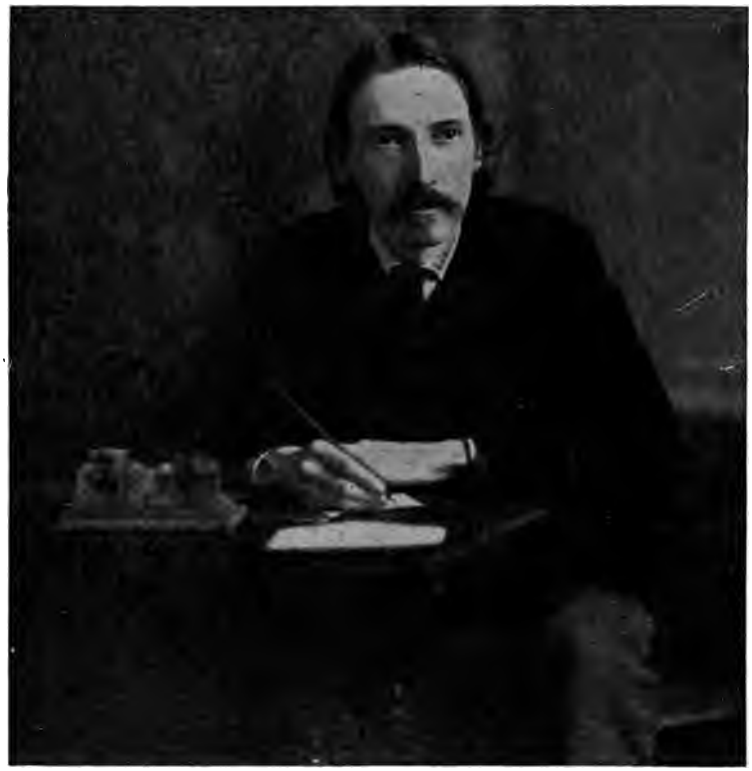
to rest, having had one leg amputated, she came to America across a sea infested with submarines, in order to continue her work. Unlike Roosevelt in every outward detail, she was his twin sister in cheerfulness, thoroughness, friendliness and will power. Read her autobiography and you will see that though she was blessed with a healthy body, it was the *woman herself,* not her tools, that was remarkable. Her motto from girlhood, so she tells us, was "quand même," which may be freely translated, "in spite of everything." And she lived up to that motto. She never admitted herself unable to overcome any obstacle or carry out any plan. She met with many trials, but she won fame, fortune, usefulness and happiness, "quand même."

Darwin, one of the greatest scientists who ever lived, had so frail a body that he suffered constantly and had to rest at frequent intervals. But he was cheerful—he wasted no time in self-pity. He was thorough—he was perfectly willing to watch an insect for months together, if, in the end, he could learn some secret of its life. And he was, above all, a man of strong will—failures, discouragements, ridicule and abuse never turned him from his purpose. And, to-day his theories are of universal interest.

Robert Louis Stevenson, author of Treasure Island, and other delightful tales and poems, spent years in a vain battle against ill health. His "tool-chest" was only a painful hindrance to him, but his smile never faltered, his friendliness was inexhaustible, he wrote (lying in bed) a succession of stories, novels, essays and poems. In one of his poems he speaks of "my great task of

happiness." But his iron will fulfilled the task to the end. He was one of the cheeriest, bravest, best workers the world has ever seen.

So here are four people from three different countries,



ROBERT LOUIS STEVENSON

a statesman, an actress, a scientist and an author. Each worked in a different way, each had great bodily handicaps to overcome, and each triumphed by virtue of cheerfulness, thoroughness, friendliness and will power

And please note that if a man lacks any one of these

qualities, his success may be turned into failure. I suppose most of us have known someone who was a hard worker, but who was such a "grouch" that no one wanted him around. His lack of cheerfulness affected his health, drove away his friends and ruined his life.

Or a man may be cheerful enough, but so unwilling to work with others, so set on his own way and his own advantage that nobody will work with him. Selfishness in a worker is suicidal.

One of the most fatal defects in a worker is lack of thoroughness. I know a man who, one would say, has everything to make him successful. His health is good, he is cheerful and pleasant to work with, and he seems to have enough will power, but he simply will not take time and pains to do anything thoroughly well. Our grandparents had a very expressive phrase to describe half-done work; they used to say. "He gave it *'a lick and a promise.'* " Now "a lick and a promise" means quick work, but it also means poor work. And poor work is often worse than no work at all. A bridge poorly built may wreck a train. A meal poorly cooked may spoil a family's health. Even a tool poorly made may inflict a lifelong injury.

Worst of all possible defects in the "man behind the tools" is a weak will, a lack of determination. We sometimes say that so-and-so "has no backbone." Now we know what would happen to a man's body if he had no physical backbone. The same thing, in a spiritual sense, happens to the man himself if he has no backbone of will-

power. He is a jellyfish carried hither and thither by the tide of desire or circumstances. He is not the *owner* of his body, but is owned by it.

As I enter the subway station every night, I pass a news-stand kept by a very remarkable man. I know that he has wonderful will-power, and that he *owns* his body, although I have never said anything to him but, "Evening Post, please."

He has no hands. One is cut off at the wrist. The other arm is cut off above the elbow. And yet, he somehow manages to pick up and hand you your paper folded. He even, with a pencil strapped to his wrist, writes letters and figures up his sales. He always looks smiling, happy, busy.

When I look at him I think of another man, slightly crippled, who stands further down the street holding out a cup and whining, "Help a poor cripple! Help a poor cripple!"

I feel sorry for this man, but I *honor* the other man. America needs such men as he, men who, even with broken tools, can do their honest share of honest work.

You boys and girls are at an age where it is largely within your power to strengthen your bodies so that they will serve you long and well. Everyone of us, for his own sake and for his country's sake, should strive for health. But while we strive for health, let's also strive, quite as long and hard, for the *working virtues* of cheerfulness, helpfulness, thoroughness and determination. Without these, our tools of strength and health will be useless and

the work for which we came into the world will remain undone.

THE OWNER OF THE TOOL-CHEST

What were Roosevelt's four "working virtues?" Show how they helped to make him a great man.

What was Sara Bernhardt's motto? Show how she used it to win fame and happiness for herself.

What qualities did Darwin have which enabled him to do his great work?

What was R. L. S.'s "great task?" Show why it was hard and how he accomplished it.

Make a little card, about 2 x 4 inches, to stick in your looking glass where you will see it daily. Put on it five words that will remind you of the qualities you need most of all to make your life successful. What will the five words be? Why choose these?

PART II
A CITY OF GOOD NEIGHBORS

A CITY OF GOOD NEIGHBORS

CHAPTER I

GOOD NEIGHBORS

EVERY boy and girl loves the story of Robinson Crusoe. I used to think it would be the greatest fun in the world to be shipwrecked on a desert island. I longed to build a hut of palm-branches, to drink water from a cool spring, instead of a faucet, to have a clear pool for a bath-tub, and to pluck strange fruit and berries, instead of sitting down to a respectable dinner-table.

But you remember that Robinson Crusoe grew terribly lonely, and when he saw Friday's foot-prints, was ready to cry for joy to think that, at last, he had a companion.

This longing for company seems to be a part of our nature. Indeed it is a part of animal nature, too. The birds, overhead, fly past in flocks, the sheep and wild horses move in herds, the bees and ants live together in colonies. Even the fish, if you look into the clear, golden-brown shallows of the brook, can be seen darting about in crowds.

So it is with men—they dread loneliness, they want to be together. But before they are, as we say, "civilized," they love to wander, like the wild animals, from place to place. Did you ever see a gipsy-camp? The gypsies are like Indians—they cannot endure city life. So they pack all their furniture into queer carts like "prairie-schooners." When they decide to camp awhile, off comes

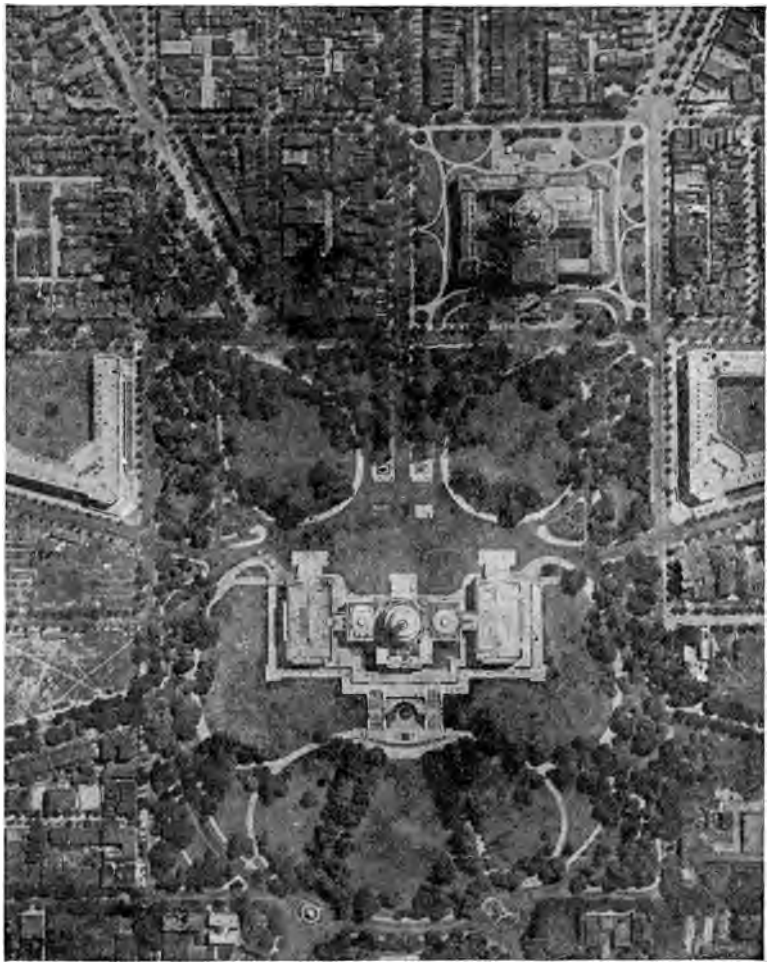
the canvas top of the cart, and it is pegged down to form a tent. Usually, they camp near a stream where they can drink and bathe—though I don't think they bother much about bathing. They buy or steal food from the farmers and cook it over their camp-fire in a "gipsy kettle." As they have no bathroom but the brook, so also they have no garbage collector, or ashman. They dump their ashes and refuse all about the camp, and when it becomes too cluttered or too smelly for comfort, they pack their wagons, and off they go.

I suppose almost everyone would like to live in this care-free way for awhile. It is great fun, in summer, to camp out, to paddle a canoe down a sunlit river, to sleep under the stars, to strap a satchel on one's back and tramp through the country lanes. But, for most of us, a few weeks of wandering is enough. We are glad to get back to our comfortable bed and warm bath and good meals. We are glad to see our friends and playmates, again. We want to know how our garden is getting on, whether our pets are all right, what has been happening while we were gone. We want to take up our work and play again. I've even known some children who were eager to get back to school again, after their summer in the country.

It is the desire to stop wandering and settle down that leads men to give up living in tents and to build cities of wood and stone.

A hundred years ago, almost everyone in the United States lived in the country. Only one person in twenty lived in a town of eight thousand, or over—as large as *Annapolis,* Maryland, or Brattleboro, Vermont. But

people flocked more and more into the cities, until now, over one third of the people live in cities of that size or



Washington from an Airplane.

larger—and still the population in the cities is growing more than three times as fast as in the country.

If you could look down on a great city from an

aeroplane, you would see thousands and thousands of houses, stretching in every direction, each house the home of perhaps one, perhaps a dozen families. And you would see, also, many stores and factories and schools and libraries and theaters and parks, where all these people work and learn and play together.

In the city, nobody is a Robinson Crusoe. Nobody has to draw his own water, raise his own vegetables and kill his own meat, like Robinson Crusoe, but neither can anyone be like Robinson in doing exactly as he pleases, without thinking of other people. City people cannot build a gipsy fire in the street. They must not bathe in the city reservoir. They must not keep cows and chickens in their back-yards. They must not throw their ashes and garbage on the sidewalk. If people enjoy playing and working and living together, rather than alone, they must pay for having company by being good company themselves. Each one must be a good neighbor to the rest.

Since the health and happiness of a city depend on how well its citizens work together, and since you school-children are going soon to be full citizens, we are going to talk about some of the ways in which city people may hurt or help each other, and make their city a dangerous, or a wholesome place in which to live. The cities of the future are in the hands of the school-children of today.

CITY OF GOOD NEIGHBORS

Contrast the pleasures of the camper's or pioneer's life with your life in a city. Next, point out all the inconveniences or discomforts of each of these two ways of living.

Prove that people today, are growing more fond of city life and its conveniences, than of the country. What do you think are the chief reasons for this?

Has each of us any responsibility for making city life safe and happy? What can we do to meet this responsibility?

CHAPTER II

A "CHANGE OF AIR"

My neighbor, Mrs. Frost, is so afraid of cold air that all winter her windows are tight shut. The other day, she came to make a farewell call on me. "I've been so worried about Dorothy and Robert," she said. "They look so pale and have no appetites, and as fast as they get over one cold, they catch another. So we are all going to Florida for a change of air. It's a dreadful nuisance to close up the house and pack everything, and the Florida hotels are very expensive, but I think a change of air is what the children need."

Of course, I told Mrs. Frost that I hoped the Florida air would benefit Dorothy and Robert, but I couldn't help thinking that it would be a great deal easier and cheaper to stay at home and get a "change of air" by opening the windows.

But that is the way with most people. They spend time and money travelling for a "change of air," but never think about keeping their own houses fresh and airy, or about helping to keep the air of their city clean and sweet for themselves and their neighbors.

My home is in New York, where the houses stand one against another like a row of dominoes. This morning, sitting at my open window in the Autumn sunshine, I looked across the back-yards to the rear of the houses on the next street and counted the windows. I could see sixty-three of them and of the whole sixty-three, how

many do you suppose were open? Only thirteen! All the rest were shut as tight as if air were a deadly poison, instead of the greatest blessing in the world.

And it is not city people only that are afraid of air. I know a dear old Quaker lady, who lives in the country in a charming white house, with green shutters. The

night breezes there are sweet with honey-suckle and musical with the tinkle of a brook under the windows, but when the old lady bids me good night, she always says, "Now dear, be sure thee closes thy window tight. The night air here is full of malaria." The dear soul seems never to have heard—what the doctors discovered long ago—that it isn't night air at all, but something quite different that gives people malaria.

Even worse than keeping the windows shut is having *almost no windows* at all. Sometimes, in the open

country, we see houses built in a row, with no chance for side windows. Sometimes, too, you will see a country house standing alone, with air all around it, and only a few small windows to let the life-giving air in. In a delightful book of travels, Mr. George Kennan tells about the houses of a certain Siberian tribe called the Koryaks (or Koraks). They have no windows or doors—only a chimney-hole, through which to get air and enter the house. Mr. Kennan says that, when he slid down a pole through the chimney into the midst of the family, he felt like a very sooty and uncomfortable Santa Claus.

It seems horrible to us to live in such a house, with no windows, but in New York and many other cities, there are thousands and thousands of rooms that get no outside air and are almost as dark as the Koryak houses.

The trouble in large cities is that the land costs a great deal, so the houses, instead of being two or three stories high, with lawns and gardens around them, are piled up and up, ten or twelve stories or even higher and packed solidly together, so that hundreds of people may live in one tenement or apartment house. In many old parts of the city there are no back yards at all, as a rear tenement has been built back of the one on the street. Of course, this leaves the children no place to play but the street, but I am afraid the men who built these old tenements were not thinking about the children at all, but only about how they could pack in the most tenants and get the most rent money.

Now, if you build two houses right back to back, with no yard between, it will make all but the front and back rooms dark. So these tenements have an air-shaft built in

the middle, and all the air the inner rooms get comes from this air-shaft. But what we need is not simply air, but "fresh" air—air that has not been kept standing. If air stands shut up in a room, or a mine, or an air-shaft, it seems to become unwholesome, just as water that is stagnant is not fit to drink. If you want to see what air-shaft air does, try this experiment.

Light a short piece of candle and set it on a tin plate, so that it cannot set fire to anything. Then take a mailing tube, or any other long, stiff, narrow tube, and set it around the candle, holding it down so that no air can enter the bottom. The light will burn more and more dimly and at last go out.

We, of course, are not candles, but our lungs must carry air to our blood, so it can burn up our food and heat our bodies, just as the candle needs air in order to burn the wax. If you blow gently on a candle flame, it will *flare up brightly*. In the same way, moving air will

make the burning process inside our bodies go on briskly and keep us well. There is nothing more refreshing than a good breeze of clean air. But the standing air in a closed room or an air-shaft will do to us what the standing air in the tube did to the candle—it will dampen our fires and make us feel tired and stupid and headachey.

How would you like to sleep here?

I am glad to say that in New York, and many other cities, landlords are no longer allowed to build such dark houses, with air-shafts instead of windows. Every builder must provide for a certain amount of air and light, nowadays, and inspectors go around to see that the law is obeyed. In olden times, there were no such laws to protect the people. Once upon a time in England, there used to be a tax called the "window tax"—that is, anyone who had more than six windows in his house had to pay a certain amount of money to the government.

Naturally, people were likely to have only a few windows, so as to avoid the tax, but, as time went on, they saw how bad this was for the health of the city and about sixty-five years ago, this way of raising money was given up.

After all, however, nothing is useful unless it is used, and a closed window doesn't let in much more air than a blank wall. When I counted the thirteen open windows this morning, I saw only three that gave the air a real chance to move properly.

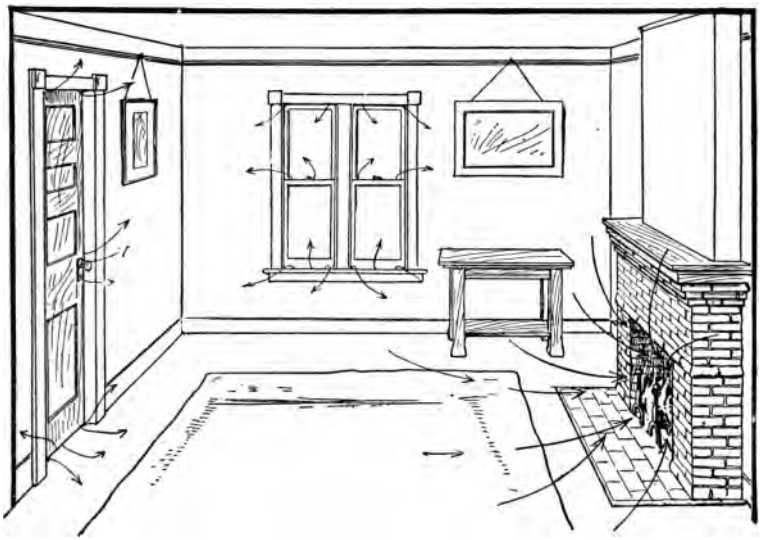
If you have ever explored one of our beautiful lakes, you know that at one end, there is a spring, or stream that flows into the lake, and at the other end, there is an outlet—a little stream that carries the water away. Now, our bedrooms and sitting rooms, our schools and churches, our street cars and trains, should each be a lake of air, with the fresh air pouring in at one end and the stale air going out at the other. Instead, they are usually like a stagnant pool, unfit for any creature to live in.

Suppose you see what effect it will have on your candle if you divide the tube in two by putting a cardboard partition down the middle. A supply of fresh air can go down one side and the stale, burnt air can go up and out the other side. You will find, that instead of going out, the candle will burn quite merrily. If you want to see which way the air is going, hold a tiny bit of down from a feather over the tube. You will see that, held one side, the down, if you let it go, will drop downward, carried by the fresh, cold air. Held over the other side, the down will float up on the current of the hot, burnt-up air.

The best way to ventilate a room is to open windows

on opposite sides, so the air can sweep right through, but not many city rooms have windows on two sides. The next best way is to open the window at top and bottom. If you hold a feather at the window, you can see, by the way it blows, that the air comes in at the bottom and goes out at the top, making a steady stream of moving air.

The air goes out at the top, because warm air is lighter



This indicates how much cracks and fireplace help in ventilation.

than cold air and always rises toward the ceiling. In a few years, when you study physics, you will learn just why warm air is lighter, but meanwhile you can see with your own eyes that it is, for the hot steam from the teakettle and the hot smoke from the factory chimney both float upward. And if you have ever been in the top gallery of a theater, you know how much hotter it is there than downstairs on the ground floor.

The first thing, then, to remember about ventilating a house, or school or theater, is that it should be full of moving air—there must be a way for fresh air to get in and stale air to get out. Sometimes, this is managed by means of windows, but in big buildings that contain many people, there are also, as a rule, pipes, or fans, to force in the fresh air, or to suck the stale air out. In many cities, there is a law that a certain amount of fresh air for every pupil must pass through the school house every hour. Do you know whether there is such a law in your city? I do not think, however, that these artificial ways of ventilating by machinery are always very successful, for most of our theatres and halls, and I am sorry to say, even our schools, are hot and stuffy.

And this brings us to the second thing to remember, that air must be like the Little Bear's porridge, neither too hot nor too cold, but "just right." Of course, people can stand fearful cold. Some of the Arctic explorers tell of places where the thermometer is seventy-five below zero. Then too, we know that men can live in terrible heat. Perhaps you have seen men feeding the engines of an ocean steamer, or working in an iron foundry. They are stripped to the waist—the firelight shining on the perspiration that streams from their faces and bodies. In such places, the thermometer sometimes goes as high as two hundred and fifty degrees—more than twice as high as on the hottest summer day. But such extremes of heat and cold are not good for anyone, and it is especially unhealthful to live in very warm rooms, because it makes one feel dull and tired while he is indoors and much more liable to take cold when he goes

out into the cool air. About the right temperature for a room where a person is sitting quietly is sixty-three degrees to sixty-eight degrees The thermometer should never go above seventy degrees, and if you are stirring about, or working, it should be much cooler.

Another trouble about an overheated room is that often, especially where there is steam heat, the air becomes very dry. Have you never noticed, when the steam is first turned on in the school-room in the fall, how dry and burnt-up the air seems? Such very dry air dries out the moist lining of our noses and throats and makes them feel sore and ticklish. When the nose and throat are dry, they are more likely to catch the germs of colds and other diseases. It is a good idea to set a pan of water on the register, stove, or radiator, so that the dry air will be moistened by its evaporation.

But even if air is fresh and moving, neither too hot nor too cold, and moist enough, it can still be unfit to breathe, because of dust and dirt. Did you ever stop to think how much dirt is being thrown into the air all the time? Careless people sweep dust out of the front door into the street. The uncovered ash-wagon goes along scattering a cloud of fine ashes behind it. The factory burns soft coal and sends a great mass of inky smoke into the sky. The automobiles speed down the street leaving a vile smelling blue trail on the air. The boy spits on the sidewalk. The saliva dries into little scales, which the wind whirls away and throws into someone else's face. In the country, dirt is quickly blown away across the fields, but in the city, it travels up one narrow street and down another, and the high buildings

prevent its ever being really swept away. Of course, it is always dirtiest nearest to the ground. That is why the air on the top floor is so much better than in the basement.

The doctors tell us that very few actual disease germs are carried by the air, but certainly, such dirty, smoky, ill-smelling air is not good for anyone, and makes him more likely to "catch" any disease germ that may happen to come his way. The dirt scratches our noses and throats, the bad smells sicken us and the smoke shuts out the sunshine and makes us "blue." Besides all this, dirt and soot soil our clothes and rooms, so that we shut the windows to keep out the dirt, and so keep out the air, too.

I'm told that in London, England, the smoke from the houses and factories throws into the air over four hundred tons of soot every day. You have often seen a wagon holding a ton of coal. Well, just imagine four hundred of them full of soot and you will realize how dirty London must be with that mass of dirt in the air. One London doctor calculated that these clouds of soot cut off, in winter, one-half of London's light and sunshine. Isn't it terrible to think that the little children of London must not only play in the narrow streets, but cannot even have the blue sky and sunlight overhead?

In many cities in America, no one is allowed to burn soft coal, for the smoke from hard coal is not nearly so black and dirty. In other cities, soft coal is allowed, but the factories are obliged to use "smoke consumers"—machinery that takes most of the soot out of the smoke before it leaves the chimney. Have you ever noticed whether the factories in your town make black smoke?

Then, too, most cities have rules against automobiles smoking, against littering the streets with rubbish and against spitting. Smoking tobacco is allowed only in certain cars, or on certain car-seats, or in certain rooms. I suppose the idea is that a man has a right to poison his own air with tobacco, but must not poison his neighbor's. Unluckily, since we all need constantly moving air, we

can't each fence off his own little piece of it, and keep it nice and clean. There is no *my* air, or *your* air, it is all *our* air, and we must all work together to keep it clean.

Of late years, people have begun to see, as they never did before, how necessary the right sort of air is. For a good many years, they experimented with machinery to get good air into the schools, churches and theaters, but now they are trying to live more and more outdoors.

Some people put tents on their roofs and sleep there even in winter. Many people, during the greater part of the year, eat their meals on the piazza—and oh, how good everything tastes! It is almost like a picnic. Several American cities have outdoor theaters and roof-gardens. Many hospitals, especially those for tuberculosis, keep the sick people outdoors day and night. And best of all are the open-air schools.

In these schools, the classes are protected from rain and snow and from high winds, but the clean, fresh air blows through the room with no windows to stop it. The children and teachers are bundled up like Eskimos, so they are perfectly warm and they all love their school work. A friend of mine who teaches such a class, tells me that the children never have colds, are all rosy and happy and do fine work. The lessons seem to be learned in half the time they used to take in the stuffy old schoolroom, and all the children beg to be kept in the open-air class.

FRESH AIR

How long, and how often, can you have the windows of your home open? Talk this over with your parents.

Why do city houses, particularly, have fewer windows than they should have? Why are such houses built so close together?

What laws in your city, or state, are there, which prevent too close building of houses? What laws are there which regulate the amount of light and air a house must have?

Repeat the experiment with the candle, described in this chapter, and use it to explain how to ventilate a room.

How is the largest church in your community ventilated? The largest public hall or theater? Your school? If possible, visit the ventilating plant of one of these places, so you can tell about it, to those who did not see it.

What is the temperature of your school-room? Get a weekly average. What are the reasons why it should not go above seventy degrees?

Why do you often see pans of water on stoves, etc.?

Make a list of the ways in which you have seen air made dirty or dusty. What harm may come from this condition of air?

What laws are there in your community about smoking chimneys?

Are there any open-air schools in your town? Could you visit one and make a report on it to your schoolmates?

What things can people do, to enjoy more fresh air? What kinds of recreations are always taken in *bad* air? What would be better kinds of recreation?

CHAPTER III

THE CLOUD

I bring fresh showers for the thirsting flowers,
From the seas and the streams;
I bear light shade for the leaves when laid
In their noon-day dreams.

I sift the snow on the mountains below,
And their great pines groan aghast;
And all the night 'tis my pillow white,
While I sleep in the arms of the blast.

That orbèd maiden with white fire laden
Whom mortals call the moon,
Glides glimmering o'er my fleece-like floor,
By the midnight breezes strewn.

* * * * * * * * * * *

I am the daughter of earth and water,
And the nursling of the sky;
I pass through the pores of the ocean and shores;
I change, but I cannot die.

Percy Bysshe Shelley.

WATER

One day last summer, I lay on the grass under a willow tree whose grey-green, feathery branches trailed into the waters of a peaceful little river. From far away upstream—so far that it sounded like a sleepy bumble-bee, came the buzz of a saw-mill. Overhead, great, puffy, white clouds sailed along. They reminded me of a poem

called "The Cloud," part of which I have put before this chapter. Perhaps you skipped it, because you think you do not like poetry; but if you read it aloud slowly, I think you will see how beautiful it is. I want you especially to notice the last two lines—

"I pass through the pores of the ocean and shores;
I change, but I cannot die."

Of course, we all know that the water is drawn from the lakes and rivers and ocean by the sun, and that it forms into clouds in the sky. We know, too, that the clouds let the water fall as drops of rain, or flakes of snow. And we know that the rain and snow feed the brooks and rivers, and so flow back again into the ocean, where their waters started. But I wonder whether you realize that we actually live, all the time, in a vast ocean of water, which flows not merely through clouds and rivers, but through trees and animals and us ourselves—through every living creature.

Do you remember the old conundrum about the woman who was "over water, under water, and yet not touching water?" The answer is that she was walking over a bridge with a pail of water on her head; but it is rather a silly answer, for everyone of us is "over water and under water," all the time. The clouds over our heads are full of water, and even when there are no clouds, the air itself always has more or less water in it. You can see that the water from warm, indoor air collects on a pitcher of ice-water, or on grandfather's spectacles, when he comes in on a frosty day. Yes, we are "under water," constantly. As for being "over water," the whole earth is one great sponge. The rain soaks into it, and where-

ever we go, we have under our feet a vast ocean of "ground water," passing through the "pores" of the earth just as water goes through the holes of a sponge, or as the watery perspiration goes out through the pores of our skins. Here and there, this water comes to the surface and forms a spring, lake, or river—which we call "surface water"—but anywhere, if we only dig deep enough, we shall at last, strike "ground water."

But not only are we under water and over water—our bodies themselves are mostly made of water—in fact, every living thing in the world is just water, colored and flavored and mixed up in different ways, with different materials.

You have learned in studying geography that two-thirds of the surface of the earth is made up of water; but did you know that about seven-tenths of your body is water, and that some plants are as much as nine-tenths water? What a terrible place this world would be, if the water, instead of flowing "through the pores of the ocean and shores," were to go away entirely! The waving, green grass would be dried-up, colorless hay. The juicy peaches and oranges would shrivel into hard, brown knots. As for ourselves, I suppose we should dry up and look as hideous as the mummies in a museum. But, as the poet says, water "changes, but cannot die," so we shall never have such a terrible thing as a waterless world.

The other day, I heard a boy fretting because, when he wanted to wash his hands, the water would not run. Someone was drawing water on the floor below, and so none could come to the upper floors. After a moment, his grandfather said, "I wonder, Harold, how you would

have liked the old town-pump that we used when I was a boy. Every family on the block had to get its water from that pump. We boys often used to stand in line half an hour before we could fill our pails and carry them home."

"But, to make up for it, you had all the fun of living in the country," said Harold.

"Country!" replied the old gentleman. "Not at all! We lived right here in New York City; but it wasn't until 1842, when I was eight years old, that there was a decent supply of water. Before that, the water was all pumped from wells inside the city. There was never enough of it, and the water was so likely to catch dirt from the street or drainage from the houses, that it often made people ill.

"You see, in those days, people knew nothing about germs. They did not know, as we do now, that typhoid, cholera, and many other diseases grow from living seeds. But they found that the city well-water was not wholesome and New Yorkers paid thousands of dollars every year for water that was carted in hogsheads from New Jersey and Long Island. As for the foreign ships that came to New York harbor, many of them took on board in casks before they left Europe, enough water to last until they got home again. It must have tasted pretty stale and unpleasant, after standing so long, but the sailors were afraid to drink New York water.

"At last, what with the people having cholera, and the wells running dry, it was decided that New York must have a new water supply from the Croton River, about forty miles away. It took seven years to build the water-

works. The Croton River was dammed, a reservoir built, and the water brought in pipes down to the city. To get the pipes across the Harlem River, they spent a million dollars in building High Bridge. Then they made a reservoir at Central Park and another on Murray Hill, at Fifth Avenue and Forty-Second Street. They thought they had enough water to last as long as the city lasted; but, bless me," the old gentleman added, with a sigh, "they never dreamed how fast the city would grow. By 1885, they had to build a larger dam and aqueduct, but still people poured into New York, and in another twenty years, even this second supply was too little. In 1907, they began the new water-works, to bring the water from the Catskill mountains—over a hundred miles away. I hear that they are talking of turning the old Central Park reservoir into a pleasure-garden. As for the Murray Hill reservoir, it long ago was torn down and the Public Library built where it stood."

A few days after this, Harold, his grandfather and I all went to a great pageant held in Central Park to celebrate, after ten years of hard work, the opening of the new Catskill water system. It was just seventy-five years since the first Croton water-works were built. The pageant was called "The Good Gift of Water" and it showed how useful water is and how New York had sent to the mountains for this good gift. More than 25,000 public school children were invited to take part. It ought all to have been very lovely, but some mischievous clouds evidently thought that a pageant in honor of water would not be complete without water. So the clouds gathered and gathered, and when the time for the *pageant came,* down they fell in bucketsfull of rain—so

the "good gift of water" was presented to everyone!

If you look at the map, you will see, up in the mountains, about 120 miles from New York City the great Ashokan reservoir. The distance around it is forty miles and it holds 132,000,000,000 gallons of water. Seven little villages were torn down to make room for it. From this great reservoir, runs the aqueduct—which means simply "water-leader." It is an enormous underground pipe, so big that a man could stand with another man on his shoulders and another on *his* shoulders, inside of it. At Storm King mountain, just south of Cornwall, a great tunnel was built, far, far under the bed of the Hudson River. At the Kensico Reservoir, the water is thrown high into the air by a thousand fountains. This is to air the water, so

as to destroy any unpleasant odor or taste that it may have gotten in travelling so many miles underground. Further along, the water is gathered into other reservoirs, the Hill View and the Jerome Park reservoirs. These reservoirs are necessary, so as to have some water ready in case anything should happen to the aqueduct and the water supply be for a time shut off. To carry the water to Brooklyn, another tunnel had to be dug under the East River. Then, after supplying Brooklyn, the great water-pipe burrowed again under the Bay, to carry its priceless gift of clean water to Staten Island. Do you wonder that it took ten years and about two hundred million dollars to build such a marvellous water-system?

WATER

Do you not think it is interesting to hunt out all the places where water occurs around us? If your teacher can give you a test tube and an alcohol lamp, try putting some dry sawdust, some starch or sugar or a piece of wood in the tube. Hold it over the flame and explain where the water comes from, which will collect inside the tube. What does this experiment suggest about the composition of other "dry" things?

How important is water to life?

Get out a map of New York State and trace, from this chapter, the water system of New York City. Why should New York have gone so far to get good water? Why should New York have spent so much money?

Do you have pumps in your town? Or do you draw water from faucets? Where does this water come from? How is it purified? How good is it? To answer this question accurately, write to the Health Officer of your city or town.

CHAPTER IV

HOW RIVERS ARE WASHED

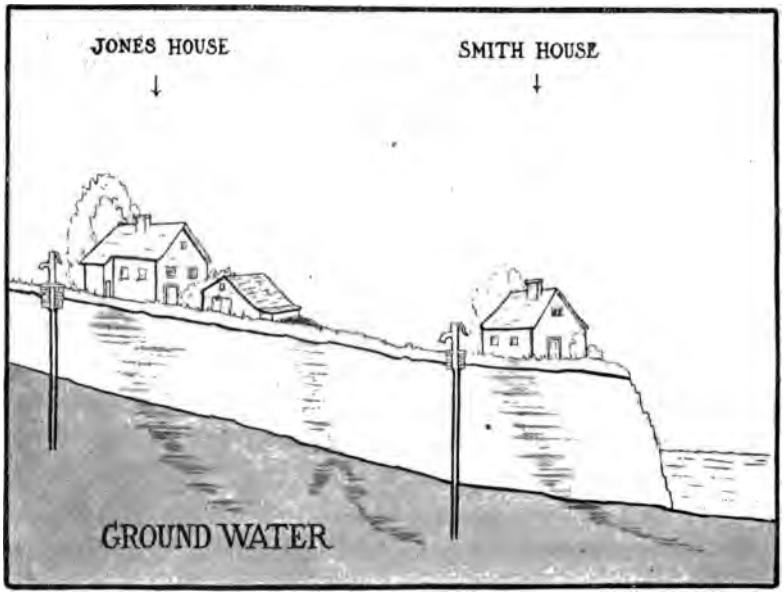
It is a great thing for a city to have such a supply of safe water as New York now has. I say "safe," instead of "pure," because "pure" means free from germs, and all natural water has germs in it. When water evaporates, it leaves the germs behind, so that clouds and steam are really "pure." You can get really pure water by holding a clean, cold plate over the tea-kettle's steam. Chemists do this in their work-shops and such water is called distilled water. Rain is really distilled water, but as it falls, it collects dust from the air and from washing over dirty roofs and falling into dirty tanks or barrels. Haven't you noticed how bright and clean the air is after a hard rain? That is because the rain has washed all the dirt out of it.

Now, the Catskill water, while it may, and does, contain many harmless germs, has almost no disease germs in it. It comes from up in the mountains, where there are no factories to hurt the water with chemicals and no towns to empty their sewers into the streams. All the way to New York, it is carried in a great pipe, with tight joints, so there is no danger of any sewer water leaking in.

There are only two sorts of disease germs that are often found in water. They are typhoid fever and cholera. Of course you realize that in any picture they are a million times too big. It takes a very, very strong

microscope to see them at all. Water may look clear and sparkling as cut-glass, and yet be swarming with invisible typhoid germs.

Now, how do these germs get into the water? If you remember that the earth is a great sponge, soaked with "ground water," and then look at the picture, you will see just what happens. Suppose, in the upper house,



Mr. Jones lives, and in the lower house, Mr. Smith. You can see all the drainage from the Jones barnyard and outhouses and from the broken sewer-pipe trickling down through the pores of the ground into the "ground-water."

When anyone has typhoid, the waste from his body is full of typhoid germs, which ought to be killed with some disinfectant, like chloride of lime. But suppose one of the Jones family falls ill with typhoid and the

waste is just thrown down the sewer-pipe with the other sewage, and allowed to trickle down into the ground-water. You can see that the Jones well will be safe enough, for the water runs away from it, downhill, but the Smith well will soon be getting the typhoid germs—and so may the river even. If the Smith family falls ill and their waste also falls into the river, the disease will presently appear in some family further downstream.

Over and over again, cities have had thousands of cases of typhoid and many, many deaths, just because some ignorant, careless person was throwing typhoid germs into its water-supply. And, even where there is no typhoid, water that has sewage in it is unwholesome and liable to give people diarrhœa and stomach-trouble, besides which, it is pretty disgusting to think of, isn't it?

Most great cities are built near rivers, because, in early days, the settlers wanted water to turn their mills, to bathe in and to drink. Then too, before there were railroads, the rivers were much used for travel. So, if you look on the map, you will see that all the big cities are near some body of water—New York on the Hudson, Philadelphia on the Delaware, Chicago on Lake Michigan, etc. Now, with cities all along its banks, how is it possible for a river to be kept clean and fit to drink? It isn't possible. And yet many cities have not the money to build, as New York did, over one hundred and twenty miles of aqueduct to carry water to them from the mountains. What is to be done about it?

For many years, people did nothing about it. Some of the more careful ones boiled the water, and so killed the germs, but most people just drank the water as it

was and every now and then, a great wave of typhoid would sweep through the city and hundreds or thousands would die.

The city of Cologne, which is on the Rhine, used to be extremely dirty, and famous for its evil-smelling, narrow streets. A poet once wrote about it,

"The river Rhine, it is well known,
Doth wash the city of Cologne.
But say, ye nymphs, what power divine
Shall henceforth wash the river Rhine?"

These verses were written long ago, and Cologne is now as clean as any other city. We know now that rivers actually can wash themselves and many cities have great washing places, where the river water is made clean and wholesome.

"How can a river be washed?" you will ask. There are several ways. First, its water can be cleaned, as I said before, by evaporating and turning into clouds; but we cannot drink clouds and, as we know, rain-water immediately gets dirty from the air and from falling on dirty roofs and other surfaces.

Another way in which streams are partly cleaned is simply by having more and more water added to them from other brooks running into them on their way oceanward. This, of course, means that the sewage in them is more and more diluted—beside which, typhoid germs do not usually live very long in water, and after they have gone a good many miles, most of them die. The sun, beating down on the water, kills a good many germs and where the water runs slowly, the heavier bits of dirt

sink to the bottom—and so the water grows clearer the further it goes.

The principal way, however, in which water is washed, is by being strained, or "filtered," through the pores of the earth. If you have ever been in the kitchen at jelly-making time, you know that the jelly is "cleared" by dripping slowly through a thick, canton-flannel bag. Now this is very much like Mother Nature's way of clearing her waters. If you dig a hole, you know that, the further down you go, the coarser the earth becomes. On top, is a layer of fine loam. Below this, there is fine, rather sandy soil. Still deeper, you come upon gravel, and finally, you strike rock or clay. The rain or river water drips slowly down through these layers and by the time it gets to the solid rock or clay is beautifully clean and free of germs.

The cities that filter their water imitate Mother Nature's plan. First, they run the river-water through pipes into a "settling tank," which, like a pond, gives the bits of dirt and stone a chance to settle to the bottom. Next, the water is run off onto a "filter bed." This is a great concrete pit, about six feet deep. On top, is a layer of fine sand, about a yard deep. Below this, is about a foot of coarse sand, next, a layer of fine gravel, then a bed of coarse gravel, then pebbles, and finally, on the bottom, a set of pipes to carry away the clean water into a covered tank, or reservoir.

Germs are so tiny that I suppose you are wondering how any sand can be fine enough to prevent them from slipping between its grains. You are right in wondering,

for there isn't in the whole world any sand fine enough to do it, without the help of the germs themselves.

What happens is this. When the water is poured upon the sand, many of the harmless germs stick to the sand-grains and cover themselves with a sort of slimy jelly. Here they stay and collect, until a layer of slime is formed all over the top of the sand. This slime catches the typhoid and cholera and other dangerous germs, like a trap. Of course, when this jelly-like coat gets so thick that even the water cannot very well trickle through it, it has to be scraped off. For awhile after this cleaning, the filter doesn't work well, until the busy, useful, little germs begin, again, to spread their net of slime and catch their dangerous brothers.

When I first saw one of these filter-beds, I thought how clever the man was who invented it, but the engineer who was showing me around said that the inventor only imitated Nature. Then he explained to me, as I have just done to you, that the earth is really a great filter, with fine soil, full of germs, on top, and under this, coarser and coarser sand and gravel, through which the water trickles and becomes purified. That is why artesian well-water is usually so pure—because these wells are very deep and the water has been filtered by going through a great many feet of earth.

In Parkersburg, West Virginia, instead of building a filter, they have let Mother Nature do their work for them. About five feet under the Ohio River, they have run a line of trenches and in each trench is a pipe. The river water, trickling down through the sand and gravel,

enters the pipes as nicely filtered as possible. All the city has to do is to carry it away through the pipes into reservoirs, so as to have it ready in case of fire, or if the pipe should break, or any other accident occur.

But suppose the water-pipe should become cracked, and sewage should leak in through the hole, or suppose the wall of the filter-bed is not tight, and germs should get in that way, or suppose, even, that we live where the water is not filtered and is dangerous—what shall we do, then?

Some people use little filters that screw onto the faucet, but it is worse than useless to do this. The water comes through entirely too fast to do any good and the filter soon gets very dirty. It is difficult to clean it and a dirty filter makes the water much worse than it was before.

The best thing to do is to boil the water. Germs can stand being frozen, but they cannot endure boiling water. So, if you are travelling and are uncertain about the water, or if your own city water is not safe, you can always make it safe by boiling it. This makes it taste rather queer, because the air is all driven out of it in boiling, but if you shake the water in a bottle, or pour it from one glass to another, to get some air into it, the "flat" taste will disappear.

If we all realized how much good health depends upon clean water, and that we must all work together to get clean water and to keep it clean, I think we should all make up our minds to do three things:—

First.—We should not waste water by leaving leaky pipes unmended, and by letting faucets run or drip. It

costs a great deal of money to build water-works and to run them for a large city, and every citizen ought to do his part by using all the water he needs, but not wasting it. Just measure, some day, the water that runs from a leaky faucet in one hour. Then calculate how much water is lost if a thousand families let their faucets run for one day. You will be amazed to see what a waste there is. In some cities, the water used by each family is measured and paid for accordingly. This always teaches the families to be more careful— but in a city of really good neighbors, I am sure everyone would be careful to avoid waste, even if he did not have to pay for it.

Second.—We ought never to do anything that could hurt the water-supply. We should never, in the country, throw sewage or any other refuse into a stream, or near a well. If any member of the family has typhoid, or any contagious disease, the waste from the sick-room should be disinfected or destroyed, so that the germs may be killed. We should also obey the laws about fishing or bathing in any water that is used as a reservoir.

Third.—We should elect honest men to serve on our Board of Water Supply, men who will do their best to see that the water is not injured, that the filter is in good order, and that the pipes are in proper condition, so that the people may have plenty of clean, safe water.

If all you school-children will only remember these three things, if you will never uselessly waste water, if you will never injure the water-supply, and if, when you are grown, you will elect good men to take care of the water, the United States will have the best water-supply in the world. Nature has been very generous to this

country. She has given us a wonderful supply of good water. Let us show our gratitude by using her "good gift" to make our cities healthy and happy.

HOW RIVERS ARE WASHED

What is the difference between "pure" and "safe" water? Make some pure water and explain how it has been purified.

What are the only sorts of disease germs usually found in water?

Explain how such germs could get into a water supply.

Why are most cities located on bodies of water? How may this location affect the purity of the water supply? How far do these statements apply to your town also?

If your town has no purification plant, what do people in your town do to get safe water?

How can the water of a lake or river be "washed" so as to be fit to drink? Could you make a model of a filter that will work? Does the process you show take out germs?

Explain how germs help to get *themselves* out of the water.

Explain why house-filters are unsafe? What could you do when on a picnic, or when travelling, or if your city waterworks failed, to get safe water?

What three steps can people take to make sure of having good water in their communities? Find out how far people in your home do these things.

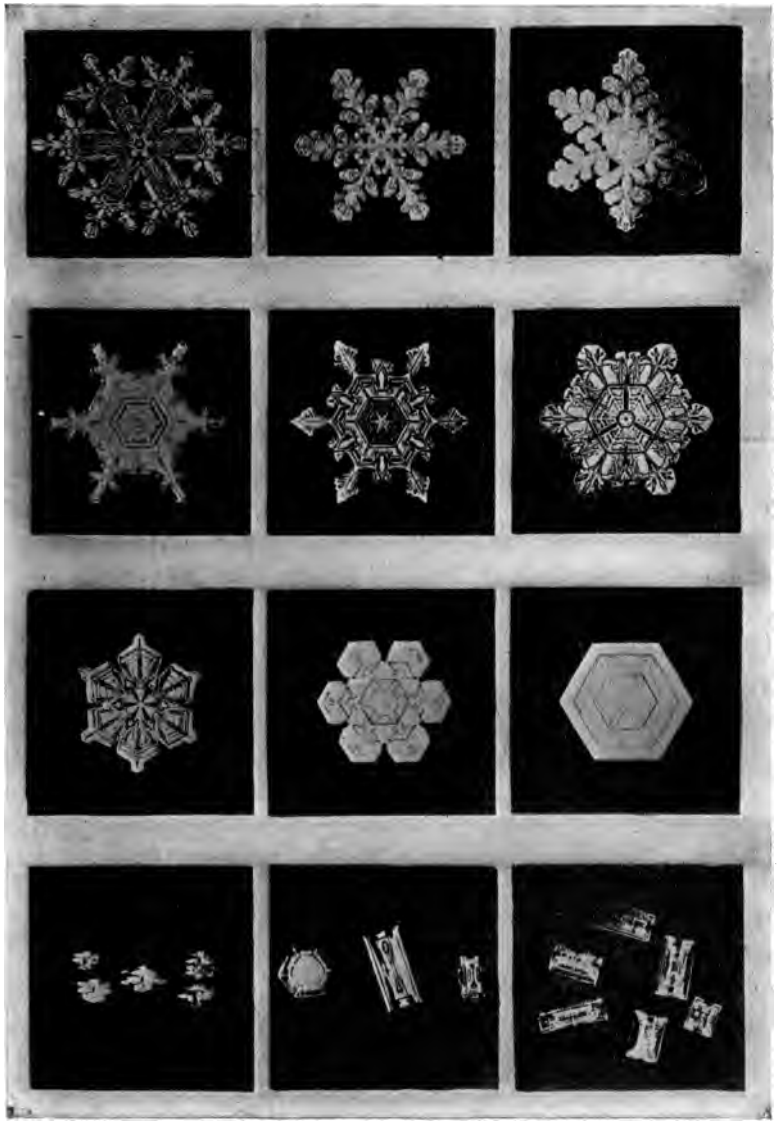
CHAPTER V

CLEAN ICE

When I was a little girl, I had a visit from my cousin, who had always lived in Cuba. In her home, frost and snow were quite unknown, and she had actually never seen a piece of ice.

It was a bitter cold day when she arrived in New York, but she was so eager to see what ice was like that we put on our warmest wraps and walked over to Central Park. When little Irma saw the dazzling ice and the merry, red-cheeked skaters darting back and forth over it, she stared and stared. Then she timidly put out her foot and tapped the ice. Next, she cautiously stepped out on the frozen surface. At last, she jumped up and down, her eyes wide with wonder, exclaiming, "I can stand on the water! Just think, I can stand and run and jump on the water! When I go home, I shall tell Mammy Dinah, but she'll think I'm fooling—she will never believe it!"

Now, I had never before thought of ice as anything marvelous. I had always taken it as a matter of course, as something that you skated on in Winter and that the iceman left at the basement door in Summer. But Irma's excitement and wonder at the miracle of solid water set me to wondering, too. Ever since that day, ice has seemed to me one of the most beautiful and wonderful things in the world.



Because it really is so wonderful, and because it is so useful and even necessary to both country and city people, I want to tell you something about it. As good neighbors, we ought all, at least, to know just what makes ice dirty and how our city can get clean, cheap ice.

If you want to see how ice forms, take a pail of water

Crevasse on Elliott Glacier, north side of Mount Hood.

outdoors on a cold, winter day and lay a mirror in the bottom of the pail. This will give a light background, against which you can see the crystals and if you have a magnifying-glass to look through, so much the better. Little by little, you will see thin fingers of ice creep out from the sides of the pail. Each of these fingers is really like a six-sided lead pencil, and is made of countless, flat, six-sided crystals, laid on edge, side by side. In the picture, you will see that all the "ice-flowers"—

though they are of many beautiful patterns—are alike in having six sides, or divisions.

The ice-fingers lace and interlace, until at last, a thin film of ice covers the whole surface of the water. What happens next? Next, though you can no longer see it, the ice-fingers, instead of growing parallel to the top of the water, start shooting straight downward, and so the ice grows deeper and deeper.

When we talked about water, you remember that we found that if water stands in a reservoir, much of the dirt settles to the bottom and many of the germs die from the sunlight, or from lack of food—and so the water is purified. Now, very much the same thing happens to water when it freezes. The first thin film of ice spreads a "coat of mail" over the water, so that the wind can no longer stir it up. Then, the water being perfectly still, all the tiny bits of dirt and other impurities settle to the bottom, just as they do in a glass of dirty water if it stands long enough.

"But how about the germs?" you will ask. That is just what the doctors and scientists asked, and in order to find out, they filled glass tubes with water full of typhoid germs and froze them solid. They found, to their horror, that while many of the germs died, many were still alive after days of freezing. In fact, they lived longer than they might have done in unfrozen water. Of course, this led many people to be afraid of river or lake ice and to prefer ice made by machinery from distilled or filtered water.

But the wisest men know that Mother Nature is far wiser than they. Two of these wise men, Professor

Sedgwick, of Massachusetts, and Professor Winslow, of New York, decided that the experiments did not really prove that ice is dangerous when Nature makes it on the surface of a lake, but only that it is dangerous when frozen solid in a scientist's workshop. So they decided to fix up a make-believe lake. They put about ten gallons of pure water in a big wine-cask and wrapped the sides of the cask very thoroughly, so that the cold could not get to the water from the sides, but only the top—just as it does in a real lake. Then they put some typhoid germs in the water and set it where the top of it would freeze.

When they examined the ice, they found in it only about one-tenth as many germs as were in the water below. A week later, they again tested the ice and found that only one-tenth of these germs were still alive; that is, of the original germs, only one-tenth of one-tenth, or one in a hundred was alive. At the end of three weeks, they tried the ice again and now found that less than one in a thousand of the germs was alive. So it was shown pretty plainly that Mother Nature, when she freezes water, cleans it about as well as one of our fine, modern filter-plants.

Nature's method is very simple. You know that, if you boil a kettle full of dirty water, the steam is perfectly pure and all the dirt is left in the bottom of the kettle. Now if, instead of heating the water, you freeze it, the same thing happens. Like steam, crystals are perfectly pure—we often hear the phrase, "as clear as a crystal." As the six-sided ice crystals form, they shut outside their walls of glass every germ, every impurity.

The fine, thin fingers of the frost, feeling their way downward through the water, thrust aside all the air and germs and leave them in the water below.

Now here is where the first experimenters made their mistake. They froze all the water in the glass tubes solid. The crystals pushed the germs away until there was no water left—then, there being no place for the germs to go, they were caught between the sides of the crystals and embedded in the ice. This very thing sometimes happens in shallow pools—they freeze clear to the bottom, and ice from such pools is unfit to use. But on a fairly deep lake or river, the dirt and germs, as the ice freezes, are almost all pushed into the water below just as they were in Professor Sedgwick's cask.

Then how is it that lake and river ice is often dirty? Suppose we go, in imagination, to one of the ice-houses on the Hudson River. We shall see, that, on the surface of the ice, leaves, weeds and twigs have been caught and frozen fast. Then too, the men and horses who tend the ice-ploughs, mark off the ice into strips and squares, and steer it through the water to the ice-house, have tramped all over the ice and left it muddy and dirty.

Beside this, the ice has sometimes been "tapped" or "flooded." When it snows, the ice-farmer feels that his ice is in danger, for all skaters know that the snow is like a warm blanket which keeps the cold air away from the ice and hinders its freezing quickly. So he cuts holes through the ice and lets the water flood over the snow and freeze.

Now, the snow is full of dust that it has washed out of the air, and the water, coming up from under the ice,

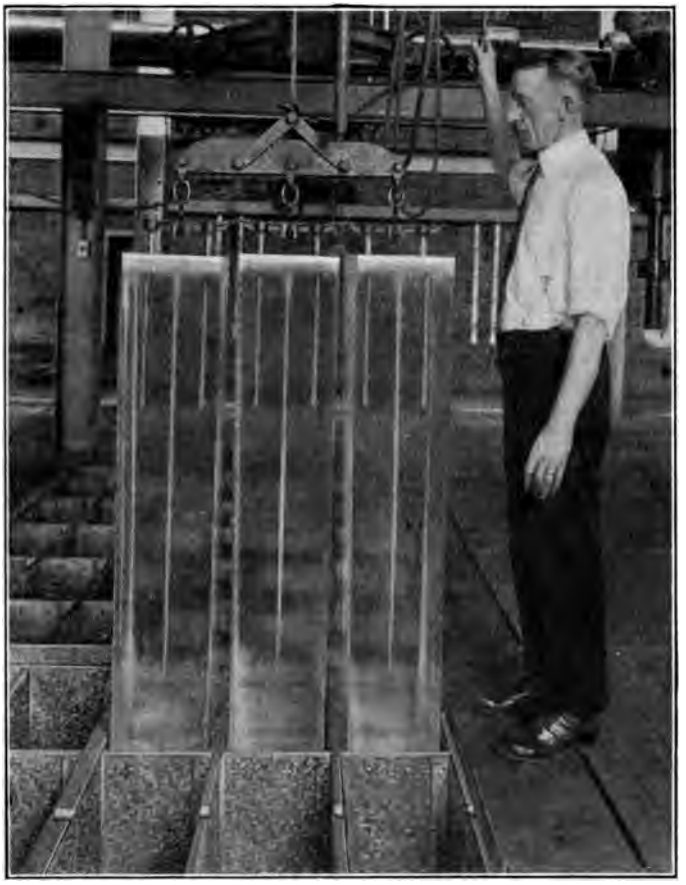
has in it all the dirt and germs which the ice-crystals had pushed downward, so you can easily see that "flooded" or "snow"-ice will have a dirty layer on top. This flooding of ice ought not to be allowed and in any case, the dirty top layer of ice should be shaved off before it is stored.

Harvesting Ice.

If you look at the picture, you will see that the ice-house has a chute something like a toboggan-slide outside it. There is an endless chain that carries the blocks of ice to the top of this slide, where they are stored away in the ice-house. They are packed with hay, sawdust, or paper to keep out the air and prevent melting. The top of the house has an air-space for ventilation and below are drain-pipes, to carry off the waste water. Here the ice is kept for many months and every day makes the ice purer, for germs, like all living things, need

food and gradually die in the clean ice, where there is none.

Right here is where natural ice from lakes or rivers is



An Ice Machine.

often really better than artificial ice, frozen by machinery. The machine-made ice can be made all the year round, so there is no use in making a lot and stor-

ing it. The result is that any germs that may be in it are not given time to die off.

The process of making artificial ice is hard to understand unless one knows something about machinery and has studied physics, but most of you have seen an ice-cream freezer and know that it is the melting ice and salt that freezes the cream. Now, an ice-machine is arranged on the same principle. There are a number of big cans, and along the sides of these cans are pipes full of ice-cold salt and water. The cans are filled with filtered, or sometimes distilled, water, which soon freezes into a clear cake of ice.

But here comes in the same trouble that the scientists had when they froze the water solid in their glass tubes. If you look at a cake of artificial ice, you will often see that, while the outside is beautifully clear, the center is whiteish, and if you look closely, you can see that this "core" is a mass of air-bubbles and even of dirt specks. The ice did its best to be clear, but there was no spare water to push the dirt into. Some ice-makers settle this trouble by not letting all the water freeze. This extra water, containing all the air and dirt, is thrown out, and the ice is all clean and clear.

Another trouble about artificial ice, however, is that sometimes the cans are not clean and often the workmen have to walk over the tops of the cans, and so dirt falls into them. So it is quite possible, unless it is carefully made, that machine-ice may be less pure than natural ice.

But, after all, a block of ice is about the cleanest thing in the world, until dirty things and dirty people touch it. The other day, as I stood in a corner grocery,

I watched the ice-man bring in the grocer's ice. Before he could get to the back of his wagon, he first had to "shoo" off of the step two ragged little boys who were quenching their thirst by licking the blocks of ice! Next, he hauled down a beautiful, clear slab and dragged it across the filthy sidewalk. As he did so, a passing ash-wagon sent a fine shower of ashes all over the ice. He seized the ice in his tongs, but, finding it too heavy to manage in this way, he slung it on his back, where it rested against his dirty, sweaty, flannel shirt. As he entered the store, the grocer swung open the door of the big refrigerator and in went the ice—dirt and all. Just then, in came the grocer's wife, with a pitcher of lemonade. "Just let me have a piece of that ice, Jim," she said. With that, she picked up a soiled knife from the counter, skillfully chipped off a piece of ice and plumped it into the pitcher. It was a very hot day and I was extremely thirsty, but when she kindly offered me a glass of the lemonade, I, knowing the history of that ice, simply couldn't accept her invitation.

A good supply of clean, cheap ice is a very important thing for every city. Ice keeps the meat from Chicago and the apples from Oregon fresh until they reach our tables. By using ice, our navy no longer lives, as it used to do, on salt meat, canned stuff and other unwholesome, preserved food. Ice keeps the baby's milk sweet, soothes the fever of the sick, cools our theaters, and makes life endurable even in the torrid, midsummer heat of the city.

Ice is so necessary to modern life that in the past few years many cities have talked of making their own ice, and a few have done it. It has thus far proved a great

success. The little town of Fernandina, Florida, makes ice in its water and electric-light plant. Ice used to be six pounds for five cents in Fernandina. Since the city plant was started, you can buy fifteen pounds for five cents. At Weatherford, Oklahoma, the city ice plant has not only brought down the price of ice, but has given a great deal away to the poor and sick.

And now what ought we, as good neighbors, to remember about ice? Just this:—

First, that dirty, cloudy ice may be dangerous and ought never to be put into water or on food.

Second, that all ice should be carefully handled and before it is used, must be washed in clean water.

Third, that if we cannot prevent careless people from handling the ice—as in theaters, cars, and so on, where porters are often careless in filling the water-coolers—the ice ought to be put *around* the water-tank, not *in* it.

Fourth, that clean, cheap ice is very necessary for a city's health and that many cities have found that it paid to have the city make its own ice, so as to have a good and low-priced supply.

CLEAN ICE

Try the experiment suggested in this book, to see how ice crystals form. Look for other examples of ice flowers on the frosted window pane. Are the forms anything like snow flakes? If so—why?

Try to explain how it comes that natural ice may be freer from germs and dirt, than the water from which it is formed.

How is natural ice made dirty in being prepared for market? How does storage improve the purity of ice? How does artificial ice compare in purity with natural ice?

What would be some results in your city, if there should be no ice obtainable for several months in spring and summer?

What four things should we remember about ice?

Which of these things can we ourselves practice?

CHAPTER VI

PURE FOOD

THE other day, on my way to market, I met my neighbor, Mrs. Frost. She looked so vexed that I wondered what could be the matter; but I did not have to wonder long. The moment she caught sight of me, she seized my arm, exclaiming, "Now, don't tell me that you are going to buy your groceries at Smith's! I've simply had to give up trading there."

"Why?" I asked, "Mr. Smith has always seemed to me quite honest—he never gives me short weight—and I'm sure his store is kept very clean."

"Oh, I daresay he's honest and clean enough," replied Mrs. Frost, impatiently, "but his things are so old-fashioned."

"Old-fashioned!" I repeated, "I never thought of food as being fashionable or unfashionable. What in the world do you mean?"

"Well, you see, Mr. Frost is very particular about his food. He always insists that the table shall be as attractive as possible. Then too," she added, with a sigh, "Dorothy and Robert have such delicate appetites that they simply will not eat anything that isn't tempting. For luncheon yesterday, I'd planned to have some nice lamb chops and French green peas, with rice, and for dessert, a raspberry-jam roly-poly."

"A very nice luncheon," I remarked.

"Yes, but what do you suppose!" she replied, indig-

nantly. "Smith didn't have canned peas, or rice, or jam that was fit to look at!"

"What was wrong with them!"

"Why, as to the peas, of course I wanted the very best French peas—the little kind that have such a lovely, fresh, green color. He didn't have any—tried to get me to buy some horrid, dull colored ones and pretended that the green ones were not so good. With the rice, it was just the other way round. I wanted nice, pure white rice not colored in any way, and his was dull and brownish. As for the raspberry jam, it wasn't a pretty, bright red, at all. I could just see Dorothy turning up her nose at it. So I told Mr. Smith that I really must have nice-looking food and that I should trade hereafter at Chase and Logan's."

"But Mrs. Frost," I protested, "that bright green isn't really the natural color of the peas, at all."

"Isn't it? Are you sure?" She exclaimed. "Why, I always understood that, in France, their peas were naturally greener than ours."

"No, indeed," said I, "I've seen them growing in French gardens, and they are just like American peas. When they are cooked, they turn dull green, just as ours do. That beautiful, 'fresh' green color that you admire is made with copper. You can make it by putting salt water on a copper cent."

"Dear me, what a pity!" sighed Mrs. Frost, "It looks so nice. But, anyhow, there's no excuse for Smith's not keeping good, pure, white rice, and I certainly shan't trade with him any more. I must have the best food and the most tempting, or the children won't eat it." With

that, off she marched, to buy her groceries at Chase and Logan's.

I was going to have some rice pudding, myself, that day and as Mr. Smith wrapped up my package, I said, "Mr. Smith, will you tell me why you keep only this dull, brownish looking rice?"

He looked up with a smile. "Because I'm a crank,

A Poor Place To Buy Food.

I suppose. When I bought this store, last year, I made up my mind to sell only the best and purest foods. This rice is the way Nature meant it to be, with its outer coat still on. The outer coat is full of mineral salts that help to keep our bodies well. But,"—and he broke the string of the package with a deft jerk,—"people like Mrs. Frost insist on having what they call 'pure, white' rice, so the millers polish off all the outer coat and with it a lot of the value of the rice. Same way with dried fruit. People want it to look white and pretty, so instead of

buying honest, wholesome, dried peaches like the sun-dried ones our grandmothers used to have, they buy the light colored ones that are bleached with sulphur. They want their pickles and peas and beans colored bright green with copper, and their jelly and catsup dyed bright red with coal-tar dye. I've tried to keep only pure, honest goods, but people like Mrs. Frost make it

A Good Place To Buy Food.

mighty hard. I don't know but that I'll have to close up, or else keep impure goods, like Chase and Logan."

As I walked home with my package of rice, I got to thinking about pure food and wondering what my neighbors and I could do to help Mr. Smith, for I didn't want him to close his store—he always kept his place so clean. Everything was kept under glass, or in air-tight packages, so no dust or flies could get in. The floor and counters

were always spotless, and Mr. Smith's apron and hands always seemed freshly washed. I really wondered how he managed it.

As I walked along, thinking, I almost bumped into my old friend, Dr. Hardcastle. "Well, well," said he, with a laugh, "You look terribly serious. What's the matter?"

As I told him about Mr. Smith's troubles, and then about Mrs. Frost, his smile faded into a frown. "It's silly, ignorant women like Mrs. Frost," said he, "that keep up the trade in impure food, instead of joining, as they ought, in the city's fight for clean, wholesome food."

"I'll tell you, Dr. Hardcastle," I cried, "I'll invite several of the neighbors to my house, tomorrow, and you shall tell us how to help in the city's pure food battle."

Dr. Hardcastle agreed and next day, half a dozen neighbors were gathered in my living room. To my disappointment, Mrs. Frost was not there. "I'd love to come," she had said, in answer to my invitation, "but I simply haven't time. It's Dorothy's fourteenth birthday, and it will take me all the afternoon to make the cake and salad."

When I repeated this to Dr. Hardcastle, he smiled grimly. "Ah, well," he said, "She'll have to learn from hard experience, I suppose, since she hasn't time to learn in any easier way."

Neither Dr. Hardcastle nor I dreamed how soon Mrs. Frost was to have her lesson.

His audience being seated, Dr. Hardcastle began, "This matter of pure food is as old as the Bible. In Leviticus are the pure food laws that Moses made for the children of Israel. In France, too, almost eight hun-

dred years ago, a fierce ruler made a law that anyone who sold impure butter should be put in the pillory, 'the butter shall be crushed down over his head and shall remain there until the sun shall have melted it.' As for anyone who sold watered milk, the milk was poured through a funnel into the mouth of the milk dealer, 'until such time as a doctor shall declare that the culprit cannot be made to swallow any more without danger of death.'

"But, in our country, the first food laws were not passed until I was a grown man. In my boyhood, on the old farm, we grew our own vegetables, churned our own butter, raised our cattle for beef, and hogs for pork and even grew the wheat for our own flour. Many a time, I rode the old, white horse to the flour mill, with a bag of wheat slung on each side of his back. The miller ground it into flour and Mother baked the bread in the great brick oven.

"Nowadays, all that is changed. For my breakfast this morning, I had bacon and eggs, buttered toast, coffee and marmalade. The bacon was packed in one of the great meat packing places in Chicago, a thousand miles away. The eggs came from western New York. The butter was sent in a refrigerator car from Delaware. The flour for the toast was milled in Minnesota. The coffee had come by rail and steamer, from Java. As for the marmalade, it had traveled all the way from Scotland, and the oranges from which it was made had ripened in a sunny garden in Spain.

"Now, when I was a boy, we knew that the food we raised ourselves was pure. As for my mother's kitchen, 'you could eat off the floor,' as they say. But how do

I know whether the hog that furnished my bacon was healthy? Did the baker that made my bread have any disease? Was it sold in a clean store? Was my marmalade pure, or was it made of half decayed oranges, colored up with yellow dye?

"It's very hard to be certain about all this, so for about fifty years past, the government of the United States, and more lately, of the states and cities, has protected us by pure food laws.

"The food law, to express it in a few words, says that

(1) Food must not be mixed with something else that is not so good. For instance, milk must not be watered. Chicory must not be put in coffee, nor cottonseed oil in olive oil.

(2) Food must not be made of decayed or diseased animals or plants—as jelly made from decayed apples, or sausage of tainted meat.

(3) Food must not have anything put into it to make it look better, or more expensive than it is, nor must anything hurtful be added. That is, it is against the law to put yellow dye in milk to make it look rich and creamy, or to put copper salts in canned peas or beans to make them green, for the copper is very bad for the stomach."

"But," timidly interrupted Mrs. Lucas, "I'm pretty certain that I've bought jam and catsup that were dyed."

"Probably you have," agreed Dr. Hardcastle. "You see, there are seven dyes made from coal-tar—'aniline' dyes, they are called—which the United States Government thinks harmless enough to allow their use. But the trouble is that even a harmless dye may be used to make poor jam, or catsup, or canned goods look pretty and sell for a higher price."

"But," protested another lady, "how can we tell what is in the canned goods that we buy?"

"There are three ways," replied Dr. Hardcastle. "The first is, *before* you buy, to look at the label. Every label should have four things printed on it:—(1) The name of the article, (2) What it is made of, (3) The manufacturer's name, (4) Where it was made. Now before you buy a jar, tin, bottle or package of food, look carefully at the label. Perhaps, in fine print, you will see that, beside raspberries and sugar, the jam contains glucose, or that the catsup has benzoate of soda in it. The Government requires every maker of any sort of food done up in a package, or can, to label it, so that everyone can tell just what he is getting, and not buy a 'pig in a poke,' as they say."

"But suppose the maker was dishonest, and the label doesn't tell the truth," put in my neighbor, Mrs. Weston. "I brought along a jar of jam that my cook bought yesterday. You see the label doesn't say a word about any dye, but I don't believe that bright red is natural."

"Neither do I," said Dr. Hardcastle, "but we'll soon see, if I may have a sauce-pan with a little water and a bit of white worsted."

I brought the articles and while we all watched, Dr. Hardcastle mixed the jam in the pan with an equal amount of water, put in the piece of worsted and then held it over the gas jet. He let it boil half an hour while he talked, then he fished out the worsted. It was bright pink and though we did our best to wash out the dye, it wouldn't budge.

"You see," said Dr. Hardcastle, "Mrs Weston was

right—the jam was dyed. Now the label says that this jam was made right here in New York. I'll take the rest of the jar, if you are willing, Mrs. Weston, around to the City Health Department. Their chemist will examine and test it, and when he discovers the dye, an inspector will call on the maker of the jam and teach him a lesson."

"Is there any way of telling whether butter is real butter, and not margarine?" asked another lady anxiously.

"Yes, a very easy way. Hold a tiny bit of it over the gas in a spoon. Real butter will boil up quietly, with a lot of tiny bubbles. Margarine will crackle and sputter. But," Dr. Hardcastle continued, "if you remember always to read the label, if you pay a fair price, and if you buy only the brands of food that you know by experience are good, you won't often have to test your food, or ask the Board of Health to test it for you. And now I think I've kept you long enough for today."

"But Doctor," said Mrs. Brown, "I want to know—"

"Oh, Doctor Hardcastle," broke in another lady, "please tell me——"

"No, no, ladies," laughed the doctor, "I'll talk to you again two weeks from today, if you wish, but not now. For today, I want you just to remember this. The Government wants to help you to get sound, wholesome food. Help the Government, your neighbors and yourselves by looking not at the pretty color, or the attractive box, but at the food itself. If it is raw food—meat, fish, fruit or vegetables, be sure that it looks and smells fresh and good. If it is cooked food—like jam, pickles, candy, and so on—be sure that it is just a natural color, not a brilliant, dyed one. Then study the label and see just

what you are getting. And if, after all, you find you've been cheated, send a sample to the Board of Health and they will help you out."

PURE FOOD

Give some reasons why you shouldn't judge the quality of preserved food by its color alone.

How are people protected from poor food when buying preserved articles? Can you describe some of the ancient laws against selling unfit food? Why do city people of today need "Pure Food Laws," where country people, and our grandfathers, did not?

What does the Pure Food Law say about foods manufactured and offered for sale? Read the labels on as many as possible of the jars, bottles, boxes, cans of food in your home. What do you find on the labels that agrees with the law? Do you find Doctor Hardcastle's four points?

Try the experiment Doctor Hardcastle describes, first with some very cheap bought jam or candy, then with some home-made jam or candy

Try Doctor Hardcastle's butter "experiment."

Tell your classmates what results you had.

What should we, as good neighbors, do to protect our communities against impure food?

CHAPTER VII

HOW FOOD IS KEPT OR SPOILED

Two weeks later, at least a dozen ladies met to hear Dr. Hardcastle, but for some time he did not come. When, at last, he entered, he looked very grave.

"I must apologize for keeping you ladies waiting," he began, "but I was called to see Mrs. Frost's little girl. She is ill with typhoid fever."

"Dorothy Frost?" exclaimed Mrs. Weston, "Why, my little Ruth went to her birthday party only two weeks ago. How did she get it, Doctor?"

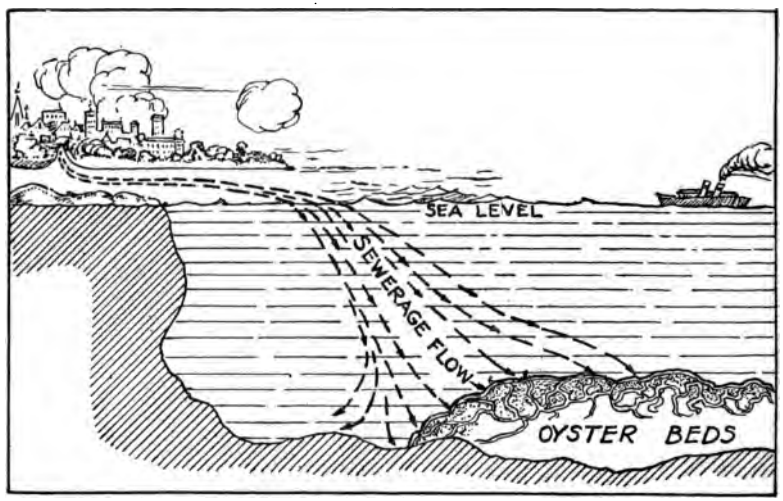
"Why, it's an odd thing," said Doctor Hardcastle, "and at first, I was puzzled about it. You know typhoid germs are almost always carried in one of four ways—either in water, milk, food, or on the feet and bodies of flies. Now, Dorothy has been drinking the same water and milk that all the other children around here drink, and there are practically no flies, at this time of year. As to food, I couldn't at first find that she had eaten anything different from the rest of the family. At last, I discovered that the night of her party, there were stewed oysters."

"Goodness!" exclaimed Mrs Weston, turning pale. "Why, Ruth ate some of those oysters."

"Don't worry, Mrs. Weston," said the doctor. "Remember that boiling will kill the liveliest germ. It wasn't the cooked oysters that hurt Dorothy. In the afternoon, before the party, Dorothy went into the

kitchen where Mrs. Frost was mixing the birthday cake. She was rather hungry and going to the refrigerator, saw the raw oysters. Mrs. Frost tells me that Dorothy is very fond of them, and before she knew what her daughter was doing, Dorothy had eaten half a dozen of the raw oysters.

"I at once started to trace the history of the oysters.



It seems that Mrs. Frost bought them from O'Brien, and he had gotten them from a wholesaler, who had fattened them in a fresh water inlet on Long Island. You know, after the oysters are taken from the ocean, they are put into fresh water to 'plump' them and make them look and sell better. I visited other customers of O'Brien's who had bought some of the same lot of oysters, and found that two of them had eaten the oysters raw and had come down with typhoid.

"Next, I visited the wholesaler and examined the

inlet where the oysters had lain. I found that farther up the inlet, lived a fisherman's family. The fisherman's wife had had typhoid and their sewer emptied into the inlet. The seeds of typhoid had been carried right past the place where the oysters lay and so the oysters had carried the germs to Dorothy."

"I know a man who got typhoid from eating celery," said my neighbor, Mrs. Porter.

"Yes," nodded Dr. Hardcastle, "Any raw food may carry the germs of disease, or the eggs of insects, and ought to be very carefully washed before it is eaten. Instead, most children and many grown people will buy an apple from a fruit stand and put it, covered with the street dust and the grime from the appleman's hands, into their mouths."

"Yesterday," put in Mrs. Weston, "I saw such a nice fruit-stand. It was all covered with glass and looked so clean and attractive—and so did the man who kept it."

"That sort of stand," said the doctor, "ought to be the only kind allowed by law. The other day, I went down to a filthy basement on Mulberry Street, to see a little chap who has tuberculosis. While I was there, in came his father with an open push-cart, full of dusty, half-decayed fruit. The poor fellow had had bad luck and was bringing almost his whole stock home unsold. It seems he was in the habit of keeping his fruit right there in the room where four people ate and slept. Often the fruit was piled up in a dark corner under the bed. Just fancy the risk you would run in eating that fruit without first scrubbing it.

"You remember that the other day, I told you some-

thing about pure food laws and how to avoid food that was dyed or mixed with cheap stuff; but, really, the chief danger from impure food is the germs of decay and disease that often grow in it. You know that some of the tiny plants which we call germs, or bacteria, make food decay, while others, like the typhoid germ, cause disease. Now, you can't shoot or stab a germ. There are just three ways of attacking him—boiling, freezing and poisoning.

"A few minutes boiling will end the career of the strongest germ. That is why none of the children at Dorothy's party caught typhoid from the stewed oysters. You all know that cooked meat or fruit or vegetables will keep a good deal longer than raw. That is simply because the germs of decay have all been boiled to death. And when you can fruit or vegetables, you boil all the germs and then seal the jars up, so that no air can bring in fresh germs."

"I remember my grandmother's saying," put in Mrs. Lucas, " that when she was a little girl, they didn't know how to can fruit and vegetables."

"No," said Dr. Hardcastle, "Canning is quite a modern invention. The great Napoleon gave a prize of $2400 to a man named Appert, who first canned fruit by boiling and sealing it in jars. But even sixty years ago, when I was a youngster, there was very little canning done. And now, just think what would become of our Arctic explorers, our army and navy, or even of ourselves in winter, if there were no canned fruit or vegetables, no tinned sardines and salmon."

"Doctor," broke in one of the ladies, "Sometimes

I've bought a can that was spoiled. Is there any way of telling whether a can is all right?"

"There's no absolutely certain way until you open the can," replied the doctor, "but if the top of a can instead of hollowing in a trifle, bulges out, you may be pretty sure that it is spoiled. You see, when a can is not air-tight, germs creep in and as they work, they form gas and this swells out the top of the can. And another thing that I want to warn you against is opening a tin can and then letting the food stand in it. Empty the food at once into a glass or china dish, as the tin, once opened to the air, may poison the food."

"Fresh food is so much nicer than canned, though," said Mrs. Weston. "It seems a shame to cook it."

"So it does," agreed the doctor. "Boiling kills the germs, but often it spoils the fine flavor of the food, too. And that is where the freezing method comes in. Freezing doesn't usually kill germs, but it does paralyze them. You know that during the winter cold, bears, hedgehogs, moles and other animals go to sleep. Cold affects germs in much the same way; they cannot grow or spread, they just sleep. That is why food 'keeps' in the refrigerator, when it spoils on the hot, kitchen table."

"But Doctor," asked Mrs. Weston, "Is food that has been in cold storage fit to eat?"

"Several years ago," the doctor replied, "people had an idea that cold storage was bad for food and so it is, if almost spoiled food is put in cold storage to save it or if the storage place is not clean, dry and well ventilated. But if fresh, clean food is properly stored, it can be kept for months and be just as valuable for food,

though after a long time, it does lose something of its flavor. In New York State, the law does not allow food

Cold Storage Warehouse.

to be kept in cold storage more than ten months, and in Pennsylvania, it is limited to nine months.

"When I was living in Cleveland," said Mrs. Porter,

"We used to store eggs and fruit and other things in the city refrigerator. I would buy a crate of eggs, thirty dozen, when they were cheap in April, and for forty cents, I could store them in the cold storage room at the city market until the next January, when eggs were ever so much higher."

"Yes," said Dr. Hardcastle, "cold storage is a wonderful blessing. Meat and fruit, butter and eggs and vegetables, can be put in storage when they are plentiful and used when they are scarce. And just think of the great refrigerator cars that bring us fresh fruit from Florida and fresh salmon from the Pacific Ocean. There are over one hundred thousand refrigerator cars in the United States."

"I'm glad to know that cold storage food isn't dangerous," said Mrs. Weston.

"No," replied the doctor, "but remember one thing. When food comes out of cold storage it is likely to spoil rather quickly, so it should be used at once.

"And now to come to the third way of attacking the germ—poisoning him. There are some things that are bad for germs that don't especially hurt people—for instance, sugar, salt, vinegar, spices and smoke. You know that fruit cooked with sugar into a 'jam' will keep a long time—the germs of decay can't live and flourish in it, for the sugar doesn't agree with them. The same thing happens to meat that is salted or pickled or smoked. Food preserved in these ways is less wholesome than if cooked or kept cold, but sometimes one can't cook or freeze food. On my grandmother's table there were always glass dishes full of preserves and pickles. In her

cellar, stood barrels of brine with corned beef in them, and grandfather smoked pounds and pounds of ham and beef and bacon in his own smoke-house."

"Did you say that smoked and corned meat were unwholesome, Doctor?" asked Mrs. Lane.

"Oh, if you have an energetic, obliging stomach, it won't object to a little of them," smiled the doctor, "but don't eat them too often. However, our grandmothers' way of poisoning the germs and so preserving food was far, far better than the modern way." The doctor held up a bottle of catsup on whose label were the words, 'Benzoate of Soda.' "Our foolish modern way," he continued, "is to poison the germs with things that also poison us. Now you see this catsup, to kill the germs of decay, has been treated with benzoate of soda. Of course, only a tiny bit has been added—not enough perhaps to do you any serious damage. But suppose all the bottled or canned food you ate contained a little benzoate of soda, or borax, or other chemical, don't you see that your system would be kept at work all the time getting rid of these poisons?"

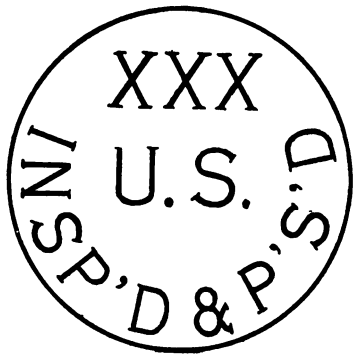
"But Doctor," asked Mrs. Weston, "since the catsup is boiled, anyhow, why do they need to put in these preservatives?"

"There would be no need whatever," replied the doctor, "if they used only clean, sound fruit, and cooked, bottled and sealed it carefully. But you see, some dishonest men use half rotten fruit and then, to cover up the bad taste and smell, add soda, borax or other poison. This does kill the germs that make the catsup taste and *smell* disagreeable, but it doesn't always kill the germs

that decay the fruit and that are likely to make you ill if you eat them."

"Do you mean, Doctor, that jam or catsup can smell and taste all right and still be made of rotten fruit or tomatoes?" gasped Mrs. Porter.

"Just what I mean," said the doctor, "so let me warn you again to study labels, to beware of extremely cheap goods, and to buy of an honest grocer."



The United States Stamp for Pure Food.

"It's very hard on the poor people," remarked Mrs. Weston, thoughtfully. "Of course they want to get food as cheaply as they can."

"Yes," nodded Dr. Hardcastle, "and that is one reason why you ladies should trade with honest grocers and help the Government in its fight for pure food for everyone, rich and poor. The United States Government has inspectors to examine all the food that comes into this country from abroad, or that is sent from one state to another. You must often have seen the Government stamp on meat, showing that it has been examined and passed."

"What becomes of the meat that isn't passed?" someone asked.

"It is destroyed. Sometimes the inspector pours kerosene oil on it, to make sure that the dealer can't sell it. You know that cows often have tuberculosis and pigs sometimes have a tiny worm in their flesh which makes pork very dangerous indeed. That is why pork

should always be very thoroughly cooked. Beside the United States inspectors, each state and most cities have a force of inspectors from the Board of Health who go to all places where food is made, the candy factories, pickling works, and bakeries—all the places where food

Inspecting and Stamping Pork.

is handled and stored—all the wharves and depots and stores and push-carts and hotels and restaurants, to see that they are clean, that the food is wholesome, and that it is not handled by anyone who is diseased."

"Mercy!" exclaimed Mrs. Lane. "What a piece of work!"

"Yes, indeed," agreed Dr. Hardcastle. "And there aren't nearly enough inspectors to do it thoroughly, so

we all ought to help by demanding clean, pure food, and going only to the stores that sell it. It means some trouble, but it's worth it if only the city can be sure of having clean, wholesome food. You know that Napoleon said that 'An army travels on its stomach.' Well, that's what we all do. If a city doesn't have clean, honest

Diseased Pork (Magnified).

food, it doesn't get very far on the road to health and happiness."

"Suppose," said Mrs. Weston, as the doctor ended, "that we form a sort of Pure Food Club. We might visit some of the big canneries and bakeries and candy factories. We could find out which brands of canned goods are most reliable and then always ask for those brands."

"Yes," put in Mrs. Porter, "If we all join together and demand pure food, the shop-keepers will have to

keep it, and we can all encourage the clean, honest men, like Mr. Smith, by buying from them. I'm going to telephone to Mrs. Frost and see whether she won't join us."

A great clatter of tongues arose while Mrs. Porter telephoned. "What did she say?" everyone asked a few minutes later.

"She said," replied Mrs. Porter, half laughing and half vexed, "that she is sorry, but Dorothy and Robert are so delicate that they keep her busy every moment, and she has no time to think about other things."

HOW FOOD IS KEPT OR SPOILED

In the last chapter we talked about putting things into foods to make them seem better than they are. In this chapter, we have thought about a very different kind of danger. For example:—How can wrongly handled food carry disease—typhoid for example, or tuberculosis? Does the government protect us in any way from this danger?

Why will cooked food keep longer than raw food? How must we use canned foods, to have them safe?

Find out by using a thermometer, the temperature of your refrigerator in several different corners. Where should you keep the milk? Why?

Why will foods keep in the refrigerator when they would spoil outside? Make a list of all the benefits to us of cold storage. What precautions should be taken in the sale and use of cold-storage foods?

What is a third way of killing germs, or paralyzing them, without harm to ourselves? How do smoked or corned meats compare in healthfulness with fresh meats?

What other reasons are there for using colors, spices and preservatives in foods besides to keep them from spoiling? How can we protect ourselves from such foods?

Explain the work of the Federal, the State and city inspectors of food supplies. Find out how many such officials protect your own food supply, and what they do.

Why do you not form a "Pure Food Club" in your school like the one described in this chapter? Such a club will improve food conditions in every neighborhood.

CHAPTER VIII

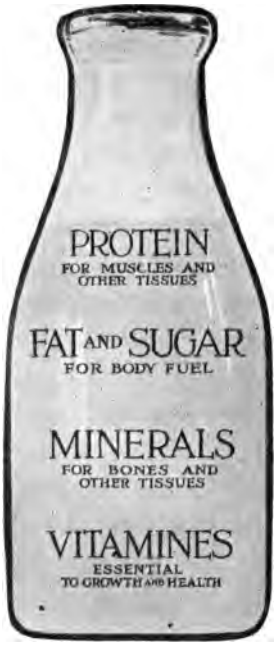
THE MILK QUESTION

You have all sung the fine old hymn, "Jerusalem, the Golden." I wonder whether you have puzzled as I used to do over the line, "with milk and honey blest." I used to think that if one were counting up blessings, honey might perhaps be included, for we didn't have it very often and it was delicious spread on bread and butter, but as for milk! Why, milk was just a matter of course —something that the milkman left at the basement door, something that I must drink a glass of before I could have any dessert. Where the milkman got it, or why it was more important than dessert, I never stopped to think.

But one day there came a terrible snowstorm. People still speak of it as the "blizzard of 1888." The snow came down in blinding masses, the wind whirled it into dazzling mountains. People could hardly plough their way through the streets and the railroads were all tied up. For several days, we could not get any fresh milk. There was condensed milk, but none to drink, and the people who had babies were dreadfully worried, lest they should fall ill. There was great rejoicing, I can tell you, when the snow was cleared away enough to let the milk trains through. From that time, I began to realize that milk is really more of a blessing than honey.

To put it briefly, milk is the most important of all foods, because (1) Babies cannot live without it and older children need it in order to keep well and strong. (2) It

contains all the materials that the body needs, protein to build tissue and muscle, lime to make bones and teeth, vitamines to keep us healthy, and fat and sugar to give the body warmth and energy. (3) It is easily digested. (4) Compared with other good foods, it is cheap. A half-pint glass of milk will give as much real food, though of a different kind, as a large helping of roast beef, or as two large eggs. It is no wonder that about one sixth of the average American family's food is milk, or something made from milk, like butter and cheese.



"But," perhaps you will say, "since milk is such a wonderful food, why is this chapter headed 'The Milk Question?' What question can there be about it except 'How much does it cost?'" The answer is that the most valuable things, if misused, often become the most dangerous—and this is especially true of milk. Clean, fresh, wholesome milk is one of the most valuable things a city can have. A dirty, infected milk supply is one of the most dangerous.

Until about seventy-five years ago, there was no regular city milk business. Cows were often kept in the city, or farmers drove a few miles into town bringing their milk from the farm. This meant that milk was drunk

quite fresh—only about twenty-four hours old, perhaps. It also meant that it was not much handled. The farmer would pour the evening milk into big tin cans, let it cool during the night, and long before light, would be carting it into the city himself. Fresh milk like this is likely to be pretty wholesome.

But as the cities grew, it became impossible to keep cows there and the farms were pushed further away from the center of town, so that the farmer could no longer deliver his milk with his own horse and wagon. By this time, too, railroads were being built. So the farmer carted his milk only to the railroad station, where it was taken into town and received by a milk dealer. The dealer paid the farmer and then resold the milk to his customers.

At this time, there were no laws against watering and skimming milk and many dishonest milkmen cheated in this way. They could easily do it, for milk is about eighty-seven per cent. water. Of the solid part, about one quarter is protein, or tissue building material, and about two-thirds fat and sugar, which are good for fuel—there is also a tiny bit of mineral matter. It is very easy for a milkman to add some water or to skim off some of the cream, without the customer's knowing it. Nowadays, the milk inspectors from the Board of Health test the milk and any milkman who sells watered or skimmed milk is severely fined or has his license to sell milk taken away.

For a good many years, any milk that had a proper amount of cream in it and was not watered, could be sold and no one dreamed that milk could be dangerous. But about thirty years ago, as doctors and scientists

learned more, and as microscopes and other instruments were improved, it was learned that "catching" diseases, like typhoid fever, diphtheria, tuberculosis and tonsillitis, are caused by the tiny plants which we call germs, or bacteria. In talking about food, water and ice, we have already seen how these germs can be carried from a sick

person to well ones, either by coughing, sneezing, or spitting, or in sewage which gets into water or food.

You remember, too, that germs find little food in water and so gradually die off, but in milk, it is quite different. If a milker who has tonsillitis coughs and a germ flies into the milk pail, the germ is "in clover." What he loves best is a warm, damp, dark place, with plenty of food, and that is just what the milk gives him. Perhaps the milk is strained, but Mr. Germ slips merrily

through the strainer into the big milk can. If the careless farmer does not ice his milk, the germs straightway begin to multiply at a terrific rate. Perhaps, at the railroad station, the can stands unprotected from the sun or from inquisitive fingers, or perhaps in the milk car there is not enough ice. If so, the germs multiply still more. Inside the can, it is warm and dark and there is both

A Chain is no Stronger than its weakest Link
Wash or wipe udders each milking
Clean milking methods
Use covered milk pails
Free from sediment
Cool quickly to lowest possible temperature
Blanket cans when delivering to station
Milking utensils clean & sterile
Clip udders and flanks
CAREFUL PRODUCTION INSURES SATISFIED CUSTOMERS AND BETTER MARKET CONDITIONS
INTERSTATE MILK PRODUCERS ASSOCIATION, Inc

water and food in the milk. What more could any germ want? No wonder that by the time he gets to your door, Mr. Germ has a family of many millions.

Now, I suppose some of you are thinking, "Well, the only safe thing is not to drink milk at all." But that would be a very great mistake. As I said, milk is the best food there is, especially for children. As for the bacteria in milk, most of them are quite harmless. Some

of them turn the milk sour, and of course, sour milk is bad for babies, but for grown people, it is not unwholesome and it is excellent for cooking and for making cheese and butter.

There are other bacteria that, in time, will decay, just as raw meat does if it is kept too long. These, of course, are dangerous. That is why milk, even kept cool so that it does not sour, may be too stale to be wholesome.

The other chief kinds of bacteria found in milk are the germs of various diseases, especially typhoid fever, diphtheria, tuberculosis and tonsillitis. These germs are very dangerous—much more dangerous than any mere dirt. In the first place, you can see dirt. If there is enough of it, the milk will look dirty and so warn you not to drink it. Bits of dirt from the manure-pile, from the milker's hands, or from the cow's flank, can to some extent be strained out of the milk, but milk may be swarming with millions of germs and yet look perfectly white.

Since, then, milk is such very good food and yet may be so dangerous, let us see what should be done to get clean, fresh milk, free from disease germs.

If you examine the caps of a lot of milk bottles, you will, in most cities, find that they are different. Some are marked "certified," some "pasteurized," and some are lettered A, B, or C, as in New York City.

Certified milk is the most expensive and is supposed to be the best milk on the market. In many cities and states, there are groups of doctors who have gotten together to see that pure milk is provided for babies and invalids. They have formed "Medical Milk Commissions." These Commissions inspect certain milk farms

to see that the cows are healthy and well fed and groomed, the barns, milk-rooms, pails, cans, bottles, and so on, all perfectly clean, the milkers clean and free from disease, the milking done in a cleanly manner, and the milk delivered fresh and cold.

Besides all this, the milk is tested. Scientists have

Milk Room.

several ways of counting bacteria, but they are rather hard to understand, so we need not bother about them now. But if, in a cubic centimeter of milk, about one quarter of a teaspoonful, there are over 10,000 bacteria, the milk is not good enough to be certified. If there are less than 10,000, and the dairy farm is, as I said, satis-

factory, the farmer is given a certificate and is allowed to label his milk "certified."

Of course, it costs more and takes more time to be so very careful with the milk, so naturally, certified milk is high priced. But, although about sixty of these medical milk commissions have been formed in this country, certified milk forms less than one one-hundredth of the whole milk supply.

Now, as to the A, B, and C grades of milk, these are inspected and graded by the city Health Departments. In New York City, Grade A milk, which is for babies and invalids, must come from cows that are healthy and are tested every year to see that they are free from tuberculosis. Also the milk must not contain more than 60,000 bacteria per cubic centimeter.

Such milk is often bottled raw—that is, without being heated to kill the bacteria; but even with the greatest care, disease germs may get into the cleanest milk. This has happened many times because the milking was done or the milk was handled by someone who was not ill enough to know it, but who, nevertheless, was harboring disease germs. Most doctors therefore think, nowadays, that the only absolutely safe way is for all milk to be pasteurized, and practically all the milk now sold in a number of large cities is pasteurized.

The simplest way to pasteurize milk at home is to boil two quarts of water in a big kettle or pail—a ten pound lard pail is excellent. Into the pail of boiling water, put the bottle of milk, which, of course, should have been kept on the ice. To prevent cracking the glass, warm it a little before putting it into the boiling water. When

the milk reaches a temperature of 142°, hold it at this temperature for half an hour, not letting it fall below 142° or go above 145°. Then take out the bottle of milk and put it on ice at once. This will kill all the dangerous germs and the milk will keep longer than it would raw.

Grade B milk is supposed to be fit for healthy grown people to drink, but in New York it must be pasteurized. The dairies that it comes from do not rank quite so high as the Grade A dairies, and while the cows must be examined every year, to see that they are healthy, there is no special test for tuberculosis. Such milk must not contain over 100,000 bacteria per cubic centimeter. Of course, it is less expensive than A milk.

Grade C milk should not be drunk at all. It is fit only for cooking. It may contain three times as many bacteria as Grade B, and in many cities its sale is forbidden by law.

If you visit a model dairy farm, you will find the cow-barn light, airy, and scrupulously clean. There is no dusty hay or feed lying about, the manure is carted away, and there are no prowling cats or dogs, or flies, to carry disease germs. The cows are kept almost as clean as if they were fine ladies. They are carefully fed and brushed and cleaned. In some dairies, they actually clean the cows with a vacuum cleaner. The hind quarters of the cows are also kept clipped, so they can easily be kept clean, and so that no hairs, covered with germs, can drop into the milk.

At milking time, in a real, model dairy, the milkers, who are examined by a doctor to see that they have no disease, wear spotless white, wash suits. With

freshly washed hands, they come in each with a washable iron stool and a clean, bright, "hooded" milk-pail, similar to those in the picture. This is to keep dirt and hairs from falling into the milk.

Ahead of each milker, goes a man who wipes the cow off with a clean, damp cloth. The milkers are never allowed to wet their hands, as some careless men do, before milking, since this makes any dust more likely to stick to them. When the milking is done, all the milk is quickly cooled, so that the germs shall not be encouraged to grow. The

empty pails and cans are all rinsed in cold water, then in hot water and soda and then scalded with steam or boiling water and dried upside down in the sun—so that not a single germ shall have a chance to live in them.

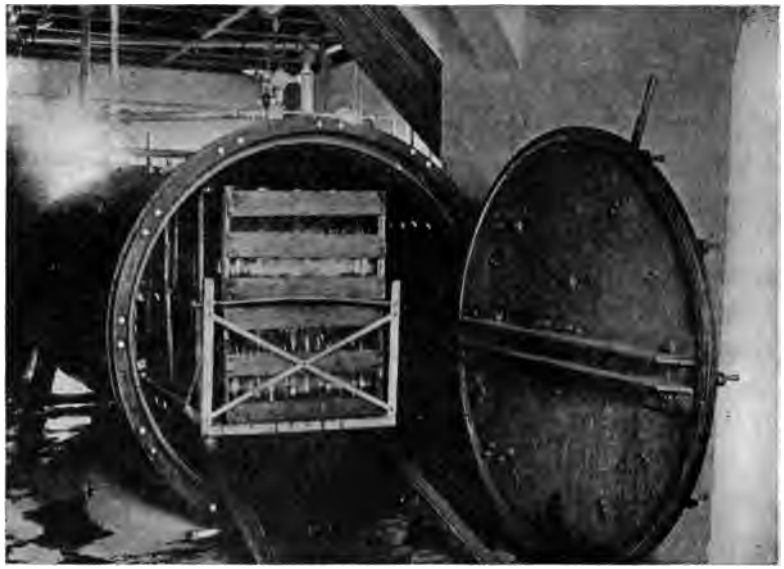
On some farms, the milk is bottled at once. On others, the milk is put into big, forty-quart cans and sent to the dairy or creamery, where it is bottled and sent out on the milk routes.

The four great things to remember about milk are that it should be (1) delivered as soon as possible, so as to be *fresh,* (2) kept *cool,* so that germs will have little chance to increase, (3) kept *clean,* since dirt is often dangerous and always disgusting and (4) kept *free from disease germs.*

As we have seen, the government is doing all it can to get clean milk for the people by teaching the farmers and dairymen, inspecting the farms and testing and grading the milk.

Now, what ought *we,* as good citizens and neighbors, to do to help? In the first place, we may as well realize that good things cost more than poor—that a quart of good clean milk, even at a higher price, is far better food and far safer than a cheap quart of stale, dirty, perhaps diseased milk. Dirty milk that is sold "loose," that is not bottled, but dipped out of an open can in a dirty grocery, where all sorts of dirt, including flies, can get to it, carried home, perhaps, in an open pail, may be "cheap," but if it makes the baby ill, it is very expensive. Many cities forbid its sale. So we must make up our minds to buy only good milk.

Secondly, we must do our share toward protecting the milk supply. Haven't you often seen milk bottles crusted with sour milk and full of dirt and dead flies? Some people even use milk bottles to hold paint, turpentine, or kerosene oil, and then give them back to the milkman for someone else to use. Even with the most careful



Sterilizing Milk Bottles.

inspection at the dairy, it is almost impossible to avoid the results of such carelessness. If the dairy is careless, and these bottles are not well washed and scalded before they are refilled with milk, they are liable to make someone ill. It is still more important that no one who has any contagious disease should come near milk that anyone else drinks. Everyone who buys milk ought to visit the dairy from which it comes to see how it is handled.

Several years ago, near Boston, a number of people came down with typhoid fever. On investigating, it turned out that all these people had spent Labor Day at a certain hotel and had all drunk uncooked milk there. One of the waitresses, who was feeling "very tired," had dipped out some milk for herself from one of the

big hotel milk cans. A few days later, this waitress had come down with typhoid and it was from her handling of the milk that the typhoid germs had been swallowed by fifty-nine people, who carried the disease to ten cities.

If people realized this danger, no family would handle its milk bottles carelessly and then return them to the milkman unscalded, or even unwashed. Where there is actual disease in a family, the bottles should be kept until the illness is over and then given to the milkman, to be separately cleaned and boiled, so that all the germs

may be killed. Paper milk bottles are now coming into use—an excellent idea, for they are perfectly clean, are used only once and are light and cheap. Until these paper bottles are in common use, however, we should all rinse our bottles in cold water, wash them in hot water and soda, then scald them in boiling water.

Clean, safe milk is so necessary for babies that in all the large cities, "Baby Milk Stations" have been opened, where ignorant mothers are taught how to feed and care for their babies and where wholesome, pasteurized milk can be bought cheaply. Thousands and thousands of babies' lives have been saved by having this good milk.

In the chapter on Water, we talked about how river water may be made unsafe. "Rivers" of milk are brought into the great cities from fifty or a hundred or more miles away. It is the duty of each one of us to try to keep these "white rivers" clean. We must demand clean milk, pay enough to get it, and report any dealer who sells dirty milk. Try straining your milk very slowly through a pad of absorbent cotton and see whether it leaves a dirty stain. If it does, talk to the milk dealer and if necessary, report him to the Board of Health. Take care of your own milk. Keep it clean, cool and covered. Never endanger the lives or health of others by letting your milk bottles get dirty, sour or diseased. Be a good neighbor.

THE MILK QUESTION

Give four reasons why milk is the most important of foods.

Why do these four reasons raise a "milk question?"

Can you give any reasons why there was less danger of bad milk seventy-five years ago, than now?

What should be the composition of good milk? How does the Board of Health protect you from the dishonest milkman who would "water" the

milk? If your Board of Health publishes any reports of milk inspection, get some and find out about your home supply of milk.

What else should we require of milk besides richness?

Why do germs flourish so well in milk? How do they get in? In what three ways may such germs affect milk? Are all such germs dangerous?

Examine the caps on your home milk bottles and report what is printed on them.

What is "certified" milk? How is it produced? What does it cost in your town? Why is it *not expensive* for babies and sick people, even if it costs more than other milk?

Tell how you would pasteurize milk for a baby if you could not get certified milk. What do you do to milk, by pasteurizing it? How should you care for it, to *keep* it safe?

What is the difference between grade "A" and grade "B" milk in New York City?

Why should New York grade "C" milk be used only for cooking? Do you have such milk in your town? Why do we use it at all?

Describe from a trip to a model dairy farm, all the precautions taken to produce good milk. If you cannot go on a real trip, take an imaginary one by pictures and reading. Explain all the interesting things you see.

List four points about good milk, which we all need to remember.

What two duties have we to encourage a clean milk supply for our home?

Describe the Baby Milk Stations in your town, after a visit. If there isn't one, read about such stations and give some reasons why one would be a good thing in your home place.

How can the "great white river" of milk from city to consumer be kept pure and wholesome?

CHAPTER IX

GUARDIANS OF PUBLIC HEALTH

We are all so used to having Boards of Health look after our welfare, that we hardly realize that they have come into existence only during the last fifty years. New York City's Board of Health was formed just after the Civil War, in 1866. Massachusetts in 1869 had the honor of starting the first state Board of Health in America.

Of course, from the earliest times, states and nations have been more or less interested in guarding their citizens' health. In ancient Egypt, a special class of priests acted as doctors. In the Bible you will read how, among the Israelites, the priests were supposed to deal with lepers, and to burn up their infected clothing. Among our own Indians, there have always been "medicine men," whose duty it is to drive away diseases by all sorts of nonsensical charms.

Before the Revolution, the American colonies had no health laws except those for quarantine, which we will discuss soon, and those forbidding anyone to "commit a nuisance." By "nuisance," the law means any act which is dangerous to the health or life of others or which pollutes the air, earth, water or food. Thus, if one of the colonists who dyed cloth threw dye into the stream from which his neighbors drank, they could bring him into court and sue him. Or if a man dumped ill-smelling refuse into the street, he committed a nuisance. I have read that Shakespere's father was sued for dumping

rubbish in the street and for not keeping his gutter clean.

But, as I have said, it was not until after our Civil War that we really woke up to the need of having a Board of Health appointed to guard the people's health.

Wars always bring epidemics, and the Civil War was no exception, for the men had been herded together in dirty, ill-kept encampments, had been wretchedly fed and clad. The result was a vast increase of illness, especially among the "catching" diseases, which in those days were not understood or rightly treated.

A wise Englishman, Havelock Ellis, has said, "Panic is the parent of sanitation." And so it was that our frightened grandparents, seeing pestilence stalking abroad after the Civil War, set to work and formed Boards of Health, consisting of doctors and other experienced men, to wage war against disease and teach the people how to keep well.

The Board of Health in a city has a vast deal to do. In the first place, it must inspect the streets, dwellings, stores, theaters and factories to see that they are clean, properly ventilated and sanitary.

It must keep track of all cases of infectious disease, must quarantine those who are ill, try to discover where the germs come from and how they are being spread. It must watch the milk and water supply, to see that they do not spread infection. If there is an outbreak of smallpox it must see that the vaccination laws are enforced. If there is an influenza epidemic, it may even close the schools and theaters.

The Board of Health is also supposed to keep track of all births, deaths and marriages. In this way, by

comparing the figures, year after year, we can tell whether our city's death rate is increasing or falling, whether we, as a city, are less or more healthy.

We have already talked about the pure food laws, and how the Board of Health protects the public from impure food. In this connection, the Health Board has rooms, —laboratories, they are called—where they can examine and test foods and medicines to see whether they are pure and good and where they also examine samples of blood, saliva, etc., to see whether the person from whom the sample came has tuberculosis, typhoid fever, diphtheria, and so on.

In many of the larger cities and in some state Boards of Health, there are departments of the Board which attend especially to tuberculosis, to the care of infants, and to general educational work.

The educational work of the Board of Health is most important. In olden times, the Boards of Health did nothing but quarantine infectious diseases, fumigate infected houses, and investigate complaints against people who "maintained nuisances." Nowadays, we know that "an ounce of prevention is worth a pound of cure," and our Health Boards do everything in their power to wake people up to the importance of keeping well. They print enormous amounts of pamphlets, they employ nurses, they publish posters, they hold exhibits. And little by little, we are beginning to learn how to live more healthfully. Gradually, we are finding out how the different diseases are caused and how to avoid them.

I cannot think of any more striking proof of what a Board of Health can accomplish than the record of New

York City. In 1870, four years after its Board of Health was formed, the death rate in New York was twenty-nine per thousand—that is, out of every thousand New Yorkers, twenty-nine died that year. In 1920—after fifty years of work in sanitation and education—only thirteen died out of every thousand. In 1920, 73,000 people died in New York. If they had died at the same rate as in 1870, 153,000 would have died. That means that in the one year of 1920, 80,000 people were saved, because New York had begun to learn the great lesson of public health.

Yes, if "Panic is the parent of sanitation," surely Health is the *child* of sanitation. And if this is so, each one of us should, as a good neighbor, obey the laws of the Health Board, understand its work, and do all we can to aid it.

GUARDIANS OF PUBLIC HEALTH

Can you tell some things done by the Egyptians to safeguard the health of their people? By Moses for the Israelites? By our American Indians? Which of these methods were wise ones?

What was done for public health in America before the Revolution?

Can you tell why the Civil War should have made people realize that cities and states needed health laws and wise, trained people to enforce them? What was the effect of the Great War on health conditions in European countries in the years immediately after the war?

Find out the early history of your home town with regard to its healthfulness. Has there been improvement? If so, how was it brought about?

Find out what health workers your town has, and what is the particular duty of each. Try to get an interview with some of these workers and report to your class what you can learn about each division of the Health Board of your town.

Is food safeguarded in your town? Find proof of your answer in reports of the Board of Health, or in trips to laboratories.

What kind of milk is sold in your town? What does your Health Department do to keep it good?

What kind of water-supply has your town? Is it controlled by your Health Department? How does it compare with the best water supply in your state?

What are the laws about vaccination in your state? How well do people in your community support these laws?

Is the population of your town increasing or decreasing in the last five years? Make graphs showing this.

Are the following sicknesses increasing or decreasing in your town, within the last five years? Show by graphs.

Typhoid? Tuberculosis? Diphtheria?

Do these graphs tell any facts about the work of your Board of Health? Prove your statement.

What special work does your Board of Health do for babies? For school children?

What does your Board of Health do to educate people in better health practices? How could you help?

Could you write a paragraph about your town or your state, or the largest city in your state, like the paragraph on Page 267, showing the accomplishments of the Board of Health in saving life?

To do so, consult the printed reports of your Health Department.

CHAPTER X

THE RED CROSS

JUST about the time that Boards of Health first began to be formed in America, a great organization started its

Clara Barton, Founder of the American Red Cross.

work in Europe—an organization which began its labors on the battlefields of Europe and which is now doing health work in every part of the world.

The Nineteenth Century was one long succession of

wars. From 1853 to 1856, England, Japan and France fought Russia in what is called the Crimean War, and no sooner was this over than France and Austria went to war.

In those days you cannot imagine how terribly the wounded soldiers suffered. While the battle raged, they were left on the ground to die or be taken prisoners—and often a battle might last several days.

A young Swiss, named Henri Dunant, who had himself been on the battlefield and seen how terribly the men suffered for lack of nursing and care, conceived the idea of forming a union of all nations to care for the wounded as Florence Nightingale had done for the British during the Crimean War.

Dunant succeeded in interesting other men of influence and the result was that in 1864, while our Civil War was still raging, fourteen nations sent men to Geneva, Switzerland, to draw up an agreement. By this agreement, which is called the Geneva Convention, the nations promised that they would all work together to care for the sick and wounded of all countries and that they would not fire on any doctor, nurse, ambulance or hospital that carried the sign of the Red Cross. The Red Cross flag was adopted—a red cross on a white ground, just the reverse of the Swiss flag, which is a white cross on a red ground. The two watchwords of the Red Cross were "Humanity" and "Neutrality," for the Red Cross cares for friend and enemy, and for all races and creeds alike.

At this time, as I have said, America was too upset by the Civil War to know or care what was happening in Europe, so we had no representative at the Geneva

Conference and, of course, no Red Cross to care for our soldiers.

We did, however, have a great many noble, devoted men and women, such as Dorothea Dix, "Mother" Bickerdyke and Clara Barton, who worked night and day caring for the sick and wounded. But they had no regular training, no organization, no official place in the army, nor power given them by the Government.

When the Civil War at last ended, Clara Barton went to Europe for a well-earned rest, and there she heard all about the new international agreement and the Red Cross. In the terrible war between France and Germany, in 1870, she saw how the Red Cross doctors and nurses worked like a well-trained army to aid the suffering, and were given every recognition and help from their Governments. Doubtless she sighed as she remembered her own hard struggle during the Civil War.

Returning to America, she talked everywhere about the fine work done by the Red Cross until at last she persuaded others to realize as she did our need of such an organization, and in 1882 the Geneva treaty was signed by the United States, and the American Red Cross was formed. Clara Barton, as was right, was made its first President.

It seems a great pity that our Red Cross could not have been formed before instead of after the Civil War. However, although there was no war, the Red Cross did not lack work. A fearful forest fire broke out in Michigan and hundreds of people were left homeless.

Here was Clara Barton's opportunity to show what the Red Cross could do. She sent out an appeal for food,

clothes and money and soon the supplies were being packed, stamped with the Red Cross seal and shipped to Michigan.

Other disasters followed—fearful floods on the Mississippi, at Johnstown, and at Dayton, and the earthquake at San Francisco. Always the Red Cross was on

Red Cross Workers, Fighting the Bubonic Plague.

hand, its workers risking their own lives to save and help others.

In addition to the National Red Cross, branches had sprung up all over the country, so that now there is scarcely a village that is not interested in Red Cross work. When the World War came, the Red Cross was indeed "The Greatest Mother in the World." Red Cross workers toiled on the battlefields, in the hospitals and among the war-wrecked homes of every land.

On September 15, 1917, President Wilson, who was also President of the American Red Cross, wrote a letter to the school children of the United States in regard to the newly formed Junior Red Cross. He said,

"Our Junior Red Cross will bring to you opportunities of service to your community and to other communities all over the world and guide your service with high and religious ideals. It will teach you how to save in order that suffering children elsewhere may have the chance to live. It will teach you how to prepare some of the supplies which wounded soldiers and homeless families lack. It will send to you through the Red Cross bulletins the thrilling stories of relief and rescue. And best of all, more perfectly than through any of your other school lessons, you will learn by doing those kind things under your teacher's direction, to be the future good citizens of this great country which we all love."

And the children of America answered nobly to the President's appeal. They saved their pennies and sent them abroad to feed the Belgian and French children. They learned to prepare surgical dressings for the wounded, they made splints, they cut out puzzles, they cut out and sewed clothing, they knitted garments. No child was too small to do his part.

And now that the war is over, the Red Cross and the Junior Red Cross are still busy, spreading the knowledge of healthful living, aiding the poor, nursing the sick, supplying food, clothing, and shelter, and above all bringing the sunshine of human sympathy into darkened lives.

"That the boys and girls of today may be taught to think first of others; that a live interest in behalf of

children near at hand and in distant countries may be aroused, stimulated and given an outlet; that, in their school days, they may come to be moved by a spirit of helpfulness and interdependence; all in the hope that the men and women of tomorrow may ever think in terms of service to others; and that they may all enjoy a bigger, better, broader citizenship—this is the purpose and goal of the Junior Red Cross."

RED CROSS

Tell the story of Henri Dunant. Why do we want to remember the Geneva Convention?

Why didn't the United States send a representative to the Geneva Convention? What difference did this make to us?

Make a story about Clara Barton's founding of the American Red Cross.

Make a list of all the kinds of work the Red Cross did in your community during the Great War.

From your reading, make a list of work the Red Cross had done *besides* war-work, in the years before the Great War. Find out what kinds of work the Red Cross is doing *now* in your town—in your state. Are *you* doing Junior Red Cross work?

If there is no chapter of the Junior Red Cross in your school find out from the nearest Red Cross Chapter how to organize one. Find out what kinds of work Junior Red Cross workers do. If you think this worthwhile work, organize a Junior Red Cross and make a program of service your group could carry out.

Why have chapters of *Junior* Red Cross been approved by men like Woodrow Wilson—do you think?

CHAPTER XI

THE YELLOW FLAG

One of the most entertaining times I ever had in my life was when my sister and I had the measles. I will admit that there were several unhappy, hot, fretty days when we were both pretty ill and could think of nothing better to do than to quarrel over the question of which was worse, my backache or her headache. The measles seems to make one feel cross and unreasonable. My sister was usually a very polite little girl, but I remember that when our neighbor, Mrs. Elwood, brought in some nice lemon jelly for her, Ethel turned away her head and said, "Take away that horrid stuff!" much to my horror and my mother's mortification.

But after a few days, Ethel and I both felt perfectly well and were ready to go back to school. The doctor, however, shook his head and said we must remain at home at least a week.

"It is necessary that they remain in quarantine," he said, "for measles is very contagious."

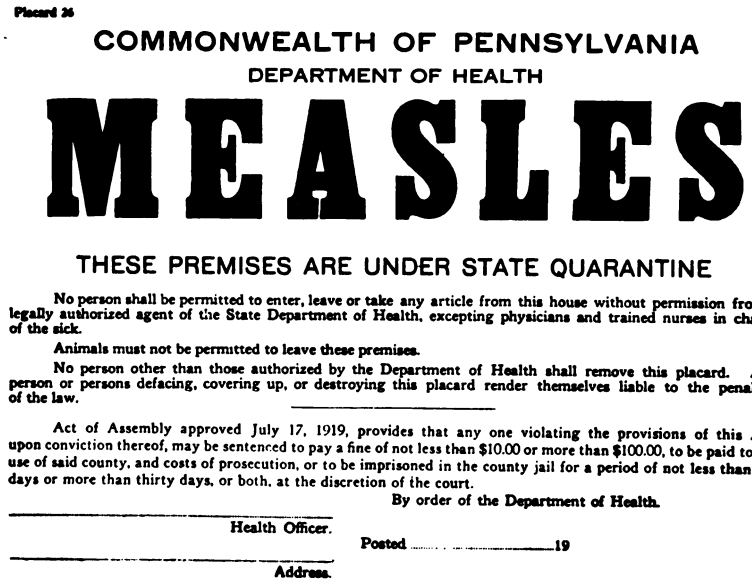
Ethel was only nine years old, but she was fond of big words and always wanted to know their meaning, so now she immediately asked Mother what "contagious" meant and whether "quarantine" was a very dreadful place.

Mother laughed. "I don't think you'll find it so very bad," she said. "Staying in quarantine simply means staying here at home and keeping away from other people, so that they will not catch the measles."

"Well then why didn't he say so, instead of talking about 'quarantine' and 'contagion'?" said I. "I hate people who use great big words for little, every-day things."

"So do I," agreed Mother, "but sometimes the big words, when you understand what they mean, and how they came to mean it, are really very interesting."

So Ethel sat on Mother's lap and I leaned against



Placard 26

COMMONWEALTH OF PENNSYLVANIA

DEPARTMENT OF HEALTH

MEASLES

THESE PREMISES ARE UNDER STATE QUARANTINE

No person shall be permitted to enter, leave or take any article from this house without permission from a legally authorized agent of the State Department of Health, excepting physicians and trained nurses in charge of the sick.

Animals must not be permitted to leave these premises.

No person other than those authorized by the Department of Health shall remove this placard. Any person or persons defacing, covering up, or destroying this placard render themselves liable to the penalties of the law.

Act of Assembly approved July 17, 1919, provides that any one violating the provisions of this Act, upon conviction thereof, may be sentenced to pay a fine of not less than $10.00 or more than $100.00, to be paid to the use of said county, and costs of prosecution, or to be imprisoned in the county jail for a period of not less than ten days or more than thirty days, or both, at the discretion of the court.

By order of the Department of Health.

Health Officer.

Posted 19

Address.

her knee and she told us all about infectious and contagious diseases and how they are treated. Nothing that I have read since has seemed so clear and interesting to me, for as Mother talked, the "big words" seemed to turn into big windows, through which I looked back into other days.

In the first place, Mother told us that the word "contagion" comes from a Latin word that means to "touch."

So a contagious disease is one whose germs are carried from one person to another by their touching each other, kissing, coughing in each other's face, or even by using the same cup, towel, or spoon. "Of course," said Mother, "you know that disease seeds, or germs, from a sick person can be carried in water, milk, food and by flies and mosquitoes to a well person and make him ill. But one of the commonest of all ways for germs to travel is on your hands."

Then she explained to us how necessary it is never to leave the toilet without washing one's hands and always to wash them before meals and how careful we should be to keep our hands away from our noses and mouths. Almost all of the germ diseases get into your body through your nose or mouth. "*Don't* 'lend them a hand'!" said Mother.

Ethel never believed anything unless she first experimented and proved it herself, so when Mother told us we must always sneeze into our handkerchiefs, because the spray from our noses (and the germs of our cold with it) would fly into the noses and mouths of people nearby, Ethel ran out into the kitchen and came back with the pepper-shaker in one hand and a mirror in the other. Then, with all the enthusiasm of the born scientist, she bravely peppered her nose and in a moment was shaken by a terrific sneeze, then another and another. But through it all, she held the mirror at arm's length before her face. Mother certainly was right, the whole mirror was spattered with the flying spray.

"Well," gasped Ethel, "I guess you're right, Mother. After this I'll always sneeze into my handkerchief and

if I sit near anyone who coughs and sneezes, I'll cover *my* nose and mouth, in case he doesn't cover his."

But one of the most interesting things that Mother told us was about "quarantine." She explained that in olden times, people did not know about the different disease germs or how to fight them. In the days of what was called the "Great Plague" about two hundred and fifty years ago, about one-third of the people of London died of it. They did not know what caused the plague, and they never dreamed of the existence of germs, but they saw that the disease seemed to go from a sick person to a well one, so wherever anyone lay ill of the plague, a red cross was painted on the front door and over it they wrote, "The Lord have mercy upon us!" Of course anyone who saw the red cross, did as anyone nowadays does when he sees a scarlet fever or small-pox sign on a house—he staid out.

One of the great difficulties in the way of fighting the spread of disease is the fact that when a city is stricken with any disease—or epidemic, as we say—the people get scared and want to move away to some other place. Then, some of them may be just coming down with the disease and carry it with them to their new home, where it spreads and starts another epidemic. Spreading disease in this way is not being a good neighbor, but many people are selfish and think only of themselves. Then too, some people are ignorant and do not realize that they are carrying danger to others.

When the plague was raging in the East, many ships laden with spices, embroideries and other oriental goods were sailing from Turkish, Persian, Egyptian and other

ports to England. Often some member of the crew would fall ill with the plague and the English were afraid to have anyone from the ship land. So they made a rule that any ship from an infected port—that is, one where there was a "catching" disease—should lie out in the harbor for forty days. If at the end of that time there

Ellis Island Immigrant Station, New York City, where Immigrants are Quarantined.

was no sign of the disease on board, the sailors and cargo were allowed to land. Now, if you have studied French, you know that "quarante" is French for "forty," and that is where we get our word "quarantine." It originally meant forty days of tedious waiting before a ship could land.

Now, however, the doctors understand better the signs of illness and how to treat it, so that ships ordinarily

do not have to wait at all. But we still at all the big ports have a quarantine station where immigrants are examined to make sure that they are not bringing in any contagious disease. A ship that is being held for quarantine flies a yellow flag, and above every quarantine station the yellow flag appears.

Of course you know that there are some diseases that are not "catching"—that is they do not come from germs and cannot travel from one person to another, and for those diseases of course no quarantine is needed. But in mumps, measles, whooping-cough, scarlet fever and many other diseases, it is very necessary that the sick person should be kept away from others—kept in quarantine.

In order to see that this is done, every town has a Board of Health and if you have any contagious disease, it is the duty of your doctor to report it to the Board of Health and in most places it is the rule that a sign must be put on your house, so that no one shall come in and catch your illness. It is really a little like the signs that they used in the time of the plague, but now-a-days we don't just say "God have mercy upon us!" We have learned how to keep well by leading healthy lives, keeping clean, getting lots of fresh air, exercise, good food and sleep and also to avoid the seeds of disease, by keeping infected water, food and milk and germ-laden hands out of our mouths.

All these things my mother told Ethel and me long ago, and I vowed then and there that I would protect myself by avoiding contagion and protect my neighbors by staying obediently in quarantine. But since I have grown up, I have been surprised to see how many people

—even grown people—seem to think it is clever to deceive their neighbors and avoid being quarantined.

The other day my neighbor, Mrs. Frost, said to me, when I asked her where Dorothy was, "Well, the truth is that she has the measles, but I'm not letting anyone know. Robert seems perfectly well and I don't want to keep him home from school, and of course if the school knew it, they'd send Robert home."

So the whole school was in danger of getting the measles just because Mrs. Frost was a bad neighbor. And yet, a few weeks later, when Robert caught the whooping-cough from a playmate, Mrs. Frost was most indignant because the child's mother had not kept him indoors. She seemed never to realize that the only way to *have* good neighbors is to *be* a good neighbor.

THE YELLOW FLAG

Explain why people use the word "contagious" about catching diseases.

What GOOD HABITS must we form to avoid taking and spreading contagious diseases?

Why is it necessary to keep away from others if you are getting well after a contagious disease—or have been exposed to such a disease? Why do we use the word "quarantine" under these circumstances?

When do ships, nowadays, still have to wait in quarantine, before landing passengers? Where is the chief quarantine station in our country?

For what diseases is quarantine necessary in your state or city? If you do not know, write to City or State Board of Health, or ask your doctor. You might also ask for how long a person must keep quarantine, today.

How will you, as a good neighbor, help your city or state Board of Health to prevent the spread of contagious diseases?

CHAPTER XII

INOCULATION

DURING the Great War, we were all thrilled by the newspaper accounts of bravery in battle and were justly proud of our brave soldiers and the fine men who led them to victory. We felt that they were saving us from an enemy who threatened the peace and freedom of the whole world.

But while we honor the army and navy, we are apt to forget that there is another army just as brave which fights to save us from just as dangerous an enemy. I mean the great army of doctors and scientists who spend their lives studying the causes of disease and finding out the best ways to fight it.

One of the best and bravest of this army was Dr. Edward Jenner, and the enemy whom he put to flight was the terrible disease called the small-pox.

I suppose that most people never have known anyone who had the small-pox—I know that I have never met with a case of it—but in olden times it was as common as the measles. Everyone, almost, had it quite as a matter of course, and a lady whose face was not marked with its ugly traces was considered a beauty. But it not merely spoiled people's looks. Many were blinded by it, and thousands upon thousands were killed.

Now Dr. Jenner, at the time of our American Revolution, was a country doctor in the beautiful county of Gloucestershire, in England. He was something of a

musician and a poet, too, and perhaps that is why he was not content to plod along doing as other country doctors did, but used his imagination and thought things out for himself.

He noticed that quite frequently dairy-maids had, on their hands, sores that came from milking cows who had the cow-pox and he heard fine ladies lamenting that they too could not have these sores, for they said that the dairy-maids who had the cow-pox never caught the small-pox.

Of course Dr. Jenner knew what we all have noticed, that there are a good many diseases that never trouble the same person twice. If you have had measles, you do not usually take it again, and it is the same with whooping-cough, mumps and many other catching diseases. Doctors still disagree as to the exact reason for this, but they all agree that when a person "catches" a disease germ, his body sets to work at once to fight the germ. After such a fight with measles, for instance, the body seems to have succeeded in developing within itself a substance that actually kills the measles germ.

So when Dr. Jenner found that the dairy-maids who had had the cow-pox did not catch the small-pox, he thought that the cow-pox must really be a light form of small-pox. "If that is so," thought he, "if I can give people the cow-pox, I shall save them from having the small-pox."

So he found a dairy-maid named Sarah Nelmes who had cow-pox sores on her hand and from these sores he took some matter, with which he "vaccinated" a little boy eight years old called James Phipps. It was called "vaccination" because "vacca" is Latin for cow. I

imagine little James must have been very much frightened, for vaccination was an utterly new thing—not a matter of course as it is now when practically everyone has at least one vaccination scar. And James's fears were not lessened by the silly talk of some grown people who said that the vaccine would make patches of cow hair grow on his body, that it would make his face look like an animal—and all sorts of other ridiculous stories.

But about six weeks later, when Dr. Jenner put some matter from a real small-pox sore into a cut on James's arm, James did not show any sign of taking the small-pox at all.

After this, vaccination became quite the fashion. All the court ladies and gentlemen hurried to Dr. Jenner to be vaccinated. In Italy, the "blessed vaccine" was received with religious processions. The Indians here in our own America sent a letter to Dr. Jenner, saying, "We shall not fail to teach our children to speak the name of Jenner and to thank the Great Spirit for bestowing upon him so much wisdom and so much benevolence." In Russia, the Empress Catherine II, ordered that the first child to be vaccinated should be named "Vaccinoff," should ride to Petrograd in her own royal coach, be educated free and given a pension for life.

And so the terrible enemy called small-pox, which had killed millions of innocent people, was overcome by a modest country doctor. To be sure, the disease has never been entirely stamped out, for there is no country where every man, woman and child is vaccinated. But if the whole world would do what Germany did in 1874 and *require* every child to be vaccinated at birth and again in

his early teens, small-pox would cease. During the war between France and Prussia, in 1870, 25,000 unvaccinated French soldiers died. Of the Germans, although

LOUIS PASTEUR

they lived right with the French prisoners, only about 350 out of a million died.

Since the days of Dr. Jenner, the great and good Frenchman, Louis Pasteur, studied further the subject of vaccination, or inoculation, and discovered how to in-

oculate people who had been bitten by mad dogs, so that they would not have the rabies and die. In cities all over the world there are now Pasteur Institutes, where people who have been bitten may go and be saved by Pasteur's treatment.

And more recently still, the discovery has been made that typhoid fever may be prevented by inoculation. During the War, our soldiers were all protected in this way. Many, many doctors and scientists are still studying this question of curing contagious diseases by inoculating people with a mild form of the seed or bacteria of that disease. Will it not be wonderful when, for every such disease, the doctor will give us a special sort of inoculation? I suppose we shall be pretty well scarred up, but think of a world where the contagious diseases are all ended!

Of course, no one enjoys being vaccinated, but we must learn to be good neighbors and work together for the common good. The Board of Health provides the vaccine and every good citizen should be willing and anxious to prevent spreading disease.

The other day I read of a case of good citizenship that I think you should know about. Toward the close of the Civil War, small-pox spread alarmingly among the men in the Confederate Army and it was ordered that the whole army, about 250,000 men, should be vaccinated. But they did not know where to get vaccine enough to vaccinate such a great number all at once. Can you imagine what they did? They took what vaccine they had and with it they vaccinated, *in six places on each arm,* every healthy child of healthy parents in the city of Richmond,

Virginia. When it was explained that this was done for the sake of the soldiers, not one child refused to be vaccinated. Two weeks later, when the scabs fell off, they were collected, and the vaccine from these scabs was used to vaccinate the 250,000 soldiers.

The gentleman who told this story said, "Even up to the present time, I occasionally see some man or woman with six faint scars on each arm, standing as a record of service rendered as an infant to the Confederate Army in 1863."

INOCULATION

Who was Dr. Jenner? Describe his observations on the dairy-maids who had cow-pox. Why did Dr. Jenner think he could help his countrymen by giving them cow-pox? Do we believe this today?

What results followed Dr. Jenner's experiments? In what ways did various people show their appreciation of his work? Describe some results of vaccination in saving health and life? Tell the story of how children saved the Confederate Army from small-pox.

How did Pasteur cure rabies?

How do we now prevent typhoid fever? Diphtheria?

Can you now explain the word that stands at the head of this chapter? What is the good of this process?

Take sides, and have a debate on this question:—

Who is the greater man, Pasteur or Napoleon? Dr. Jenner, or Lord Nelson?

What school, city or state rules are there in your community, about vaccination of any kind?

Are you a "Good Neighbor" as far as they are concerned? If not, what must you do to become one?

CHAPTER XIII

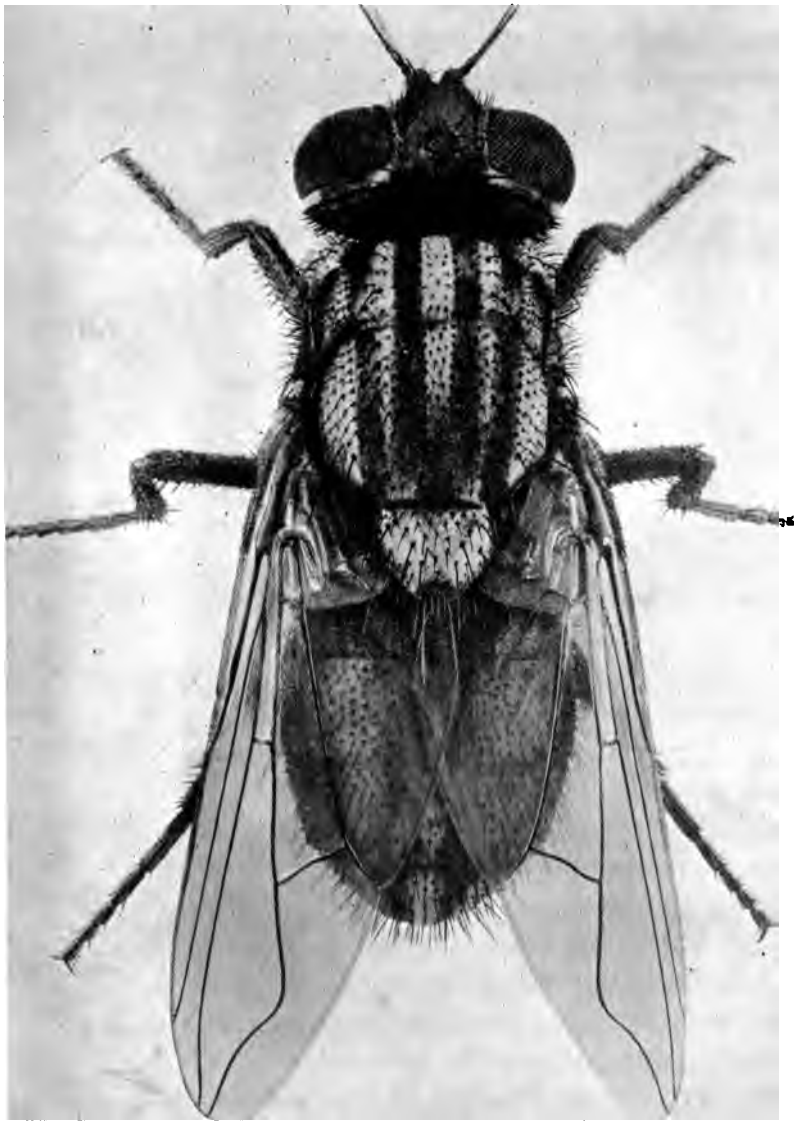
HOUSEHOLD ENEMIES

When we hear people talk about fighting dangerous animals, we generally think of tiger hunts in India, or of capturing lions and elephants, or shooting wild boars. But the other day I heard three scientists talking of dangerous animals and they were not discussing tigers and lions and elephants. They were talking about the best ways of fighting flies, mosquitoes and rats!

I don't know why it is that people always seem to think that big things must be important things, for really it is the little things in this world that make us ill or well, sad or happy. America has nothing to fear from the large animals, but some of the tiny ones are her worst enemies.

As germs have neither feet nor wings, they cannot move themselves from place to place, but must be carried. We have already talked about how they may travel in water, milk and food and on careless people's hands. Now I want to tell you something about how they make flies, mosquitoes and rats serve them as horses.

In the days before microscopes, when we knew nothing about germs, the fly was thought a bothersome creature, who loved to fall into milk-pitchers and to light on your nose when you were asleep, but no one ever dreamed that he was really dangerous. I remember in one of my books when I was a little girl, there was a picture of a



baby eating a bowl of bread and milk. A fly was also eating from the bowl and underneath were the words:

"Catch him? No!
Let him go;
Never hurt an insect so.
But, no doubt,
He flies out
Just to gad about.
Now you see his wings of silk
Drabbled in the baby's milk.
Fie! Oh fie!
Foolish fly!
How will he get dry?"

Of course the idea in these verses, that we should be kind to all animals, is a good one. It is cruel to make even a fly suffer, unless, in doing so, we *prevent* suffering for someone else. But just think, for a moment, how much suffering every fly that is allowed to live is likely to cause.

In the first place, as I said, many, many sleeping babies and helpless sick people are annoyed and lose sleep because of flies. Many people are so disgusted at having the filth-covered feet of flies walking over their food that they can scarcely eat. But worse than these annoyances are the real *dangers* that flies cause.

They fly from stables, pig-pens and out-houses straight to groceries, bakeries, and people's dinner tables. Especially in country places where there is no plumbing, a fly may carry the germs of typhoid fever from one family's out-house to the next family's breakfast-table. This is disgusting, but it is worse—it is very dangerous.

Luckily, nowadays, most places realize this danger and "swat the fly" campaigns have started all over the country. But it is a long, if not impossible task to swat every fly. The better way is to prevent the fly from being born.

Most fly-eggs are laid in the manure in stables. Therefore if all manure is kept in a well-screened place, the flies cannot get to it. Besides this, all manure should be removed frequently.

Flies also lay their eggs, if they can find no better place, in any dirt that they can find—even a dirty piece

Mass of Fly Pupae Separated from Stable Manure (Natural Size).

of old cloth will do. So every "swat the fly" campaign should include a thorough "clean-up" time. Every bit of dirty rubbish should be burned up, so that Mrs. Fly may have no nest for her eggs.

Traps and screens are useful—indeed, they are necessary, so long as a single fly is still alive—but the great thing is to *prevent* flies by destroying their nests.

Most of the flies die off when cold weather comes, but some crawl into sheltered, warm cracks and corners, or live in hot-houses, laundries, bakeries and other heated places, and when the spring comes, out they creep. Then the egg-laying begins and keeps on at such a rate that by "fly-time" in August, there are millions and millions.

If every community in America would have a campaign every spring to prevent breeding-places, and to trap and kill the flies that did get hatched, in a few years flies would be so scarce that we should be showing them in museums, as a great curiosity. In many cities the children have taken a large part in such campaigns and I don't know of any more useful thing for a boys' or girls' club to do.

Now as to the rats, the germs use them rather differ-

ently from the flies. The rats are very apt to have fleas and it is by these fleas that the germs are carried. But the germs do not travel on the flea's feet, but in his stomach.

In the East, a dreadful disease called the "bubonic plague," is very frequent. If a rat-flea bites a person who has the plague, he sucks in, with the blood, the germ

A Rat-flea (Magnified).

of the disease. Then, if this same flea bites another person, he is likely to leave the germ in the bitten place and the second person falls ill.

It is only within recent years that people have known that rats carried disease in this way, but rats are filthy animals. They swim in the sewers and walk through all sorts of dirt and then track it over food. Even if they did not carry the plague, we should not want them around our houses.

And beside being so dirty and disease-carrying, they eat up and ruin an enormous amount of grain and other food, and kill young chickens and suck birds' eggs. They destroy every year in America as much as $200,000,000 worth of property.

Many communities are trying to get rid of rats and mice and they are doing it in three ways. First: They try to keep all food in some place where rats and mice cannot reach it. Grain-warehouses, groceries and such places should be made rat-proof by having concrete foundations, heavy wire-netting at basement windows, and, in general, leaving no hole for Mr. Rat to enter. In old buildings, his holes are stopped up with ground glass. In these ways, by keeping them out of the stores and houses, and by keeping the food in tin boxes, etc., we can starve the rats and mice.

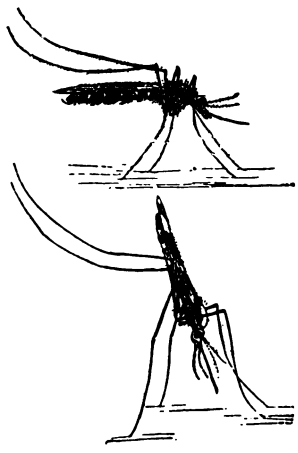
Second: Communities that are fighting rats and mice, must not leave any dark hole for them to breed in. In San Francisco in 1907, there was a plague panic and almost six and a half million square feet of concrete were laid to take the place of old board-walks, stable-floors and such places, so that the rats were left no place under which to hide and nest.

Thirdly: Every community should follow the example of Burlington, Vermont, which some years ago held a rat contest. The rat-fighters were divided into two sides. Each side killed over 8,000 rats and the side which won was given a fine dinner by the other side.

Beside the fly and the rat-flea, another insect that is a friend to germs and hence an enemy to us is the mosquito. The name is a Spanish one and means "little fly," and as you would suppose from his having a Spanish name, Mr. Mosquito is found mostly in warm countries settled by Spain—such as Cuba, Central America and South America, although he is also found clear up into the Arctic regions.

Mosquitoes can live perfectly well on vegetables and fruits but they seem to have a real passion for the taste of blood, and mosquitoes whose parents and grandparents have lived peacefully on fruit will, if they get a chance, bite just as eagerly as if they had been brought up on a meat diet.

Like the fly, the mosquito for centuries was thought an unpleasant, but harmless insect. In the warm, damp countries where mosquitoes lived, there was a great deal of malaria and yellow fever, but no one dreamed that the mosquitoes had anything to do with spreading these diseases. Everyone thought that yellow fever was caused by dirt, and so, when our troops went to Havana, Cuba, in 1898 at the time of the Spanish-American war, we thought all that was needed was to give the city a thorough cleaning to get rid of the yellow fever.



1. Yellow Fever Mosquito.
2. Malarial Mosquito.

So Havana was given such a cleaning as it had never had in its life before, but the fever, instead of disappearing, grew worse and worse and more and more of our soldiers sickened and died. Evidently, they were on the wrong track. What was to be done?

For almost twenty years before this time a doctor living in Havana, Dr. Carlos Finlay, had been trying to prove that the yellow fever germ was carried by mosquitoes, but his experiments had not worked out well.

So when the army authorities found that all their cleaning up was not doing one bit of good, they thought it would do no harm to look into Dr. Finlay's idea. A Board of four doctors named Reed, Carroll, Agramonte and Lazear, was appointed to find out the truth concerning yellow fever.

In June, 1900, they got some mosquito eggs from Dr. Finlay and hatched a brood of young mosquitoes. Then they allowed the mosquito to bite someone ill with the fever and then to bite them. These experiments caused the death of brave doctor Lazear, who died of yellow fever in September, 1900, having been bitten by an infected mosquito.

To prove beyond a doubt that the mosquito is really guilty of carrying the fever germ, Dr. Reed built a little house thoroughly screened so that no mosquito could get in or out. He divided the house by a screen partition down the center, making two rooms. Into each room he put a man. They lived and slept here for several days and kept perfectly well, so it was clear that there was no poison in the air or the house. Then he put into one of the rooms fifteen mosquitoes who were infected with the fever. Of course, they bit the man and four days later he came down with the fever. Meanwhile, the man in the other room, living in the same house, breathing the same air, remained as well as ever. After the mosquitoes were caught and taken away, this man moved over into the other room, but never caught the disease.

This made it pretty clear that the yellow fever was carried by the mosquito, but some people still thought that perhaps it might be carried in other ways, too. So

Dr. Reed built another little house that had no windows and just barely enough air to breathe. Into this house were put bedding and clothes that had been used in the yellow fever hospital. Then he called for volunteers to sleep in the room. An army doctor named Cook and several soldiers said they would do it. So they put on the pajamas and slept in the beds where the yellow fever patients had died. For twenty nights they slept there, but not one of them fell ill, so it was proved, once for all, that it is the mosquito and only the mosquito that carries yellow fever.

The next thing was to get rid of the mosquitoes. Now, as you probably know, the mosquito lays her eggs in water and the baby mosquitoes, or "wigglers," have to come to the top to breathe. So the city of Havana was divided into eight districts and into each district went an inspector. He visited every house, explaining that no water must be left standing uncovered in rain-barrels, flower-pots, roof-gutters, or other places. The water-barrels were covered with wire netting and provided with a faucet, so that the mosquitoes could not get into them. It meant a good deal of work for the Havana housekeepers, but they all knew and dreaded the fever and were glad to help in overcoming it. Old bottles and cans that might hold water were picked up and every little puddle was covered with a thin film of kerosene oil, so as to kill any "wigglers." Out in the country, the marshes were drained or oiled.

And what was the result? Yellow fever had been in Havana for one hundred and forty years without a break and for two hundred years before that there had been

outbreaks of the fever from time to time. In February, 1901, the Sanitary Department of Havana set out to end the mosquitoes. In September of the same year, the last case of yellow fever in Havana occurred.

The campaign against the yellow fever mosquitoes also killed off another mosquito which carries the malaria.

Before the year 1901, from three hundred to five hun-

New Jersey Marsh before Draining.

dred people died of malaria every year in Havana. Since then the disease has grown scarcer and scarcer until now a case of malaria is very rare.

This experience in Cuba taught the doctors so much that in 1904 they were eager to help our Government by ridding the Panama Zone of yellow fever and malaria. In Panama they did as they had done in Cuba, draining

and oiling swamps, doing away with standing water in houses, and burning powder to kill off all the mosquitoes in any house where the disease had been.

As a result, out of a force of 39,000 men who helped to build the canal, there died each year only 663. Before the United States undertook to build the Canal, the French had tried, but that was before they had learned about the

New Jersey Marsh after Draining.

mosquitoes, and while the Americans lost only seventeen men per year out of each thousand workmen, the French lost 200 out of each thousand, so that they gave up in despair.

I have told you this long story, not because you are likely to live in the tropics, but partly so that you may help in fighting mosquitoes in your own neighborhood. Partly, too. I tell it so that you may realize how many brave men

and women are fighting night and day—giving up their lives, if need be—so that you and I may be safe from disease. I think that the least we can do in return is to help the fight by taking good care of our own health, obeying the rules of the Board of Health, and being as Good Neighbors as we know how to be.

HOUSEHOLD ENEMIES

Why are flies considered more dangerous to civilized people than lions, or poisonous snakes?

What is the *most effective* way to make a neighborhood flyless? How would you go about doing this? Why is a clean-up campaign helpful? Why are fly-traps helpful? Make a fly-trap yourself and use it where there are many flies.

Why is *spring* the most important season for starting a fly campaign?

Why must we destroy rats as a *health* measure? Why destroy them as an *economy* measure?

Describe three ways to destroy rats. Which one of these could you try? Get a group of your classmates together, and make plans for the kind of anti-rat campaign you think you could carry out. Start it. Then send a description of your plan to some other school in your town and a challenge. To rid your town of rats and mice will be a piece of true good neighborliness.

Has it always been known that mosquitoes carried disease?

What made people in Havana first suspect that mosquitoes carry yellow fever?

Can you tell the story of Doctor Lazear? What good did his sacrifice do? How did Doctor Reed *prove* that mosquitoes carried yellow fever, and were *alone*, the cause of its spread?

How was Havana rid of mosquitoes?

What good did this clean-up do Havana?

How did the results of the mosquito campaign in Havana help to build the Panama Canal? Compare the French and American losses of workmen, during the efforts to build the Canal.

What other sickness is caused by mosquitoes besides yellow fever?

Now you know these facts about mosquitoes, what will you do about it, as a good neighbor?

CHAPTER XIV

TUBERCULOSIS

THE children in this picture do not look like invalids, do they? Most of us who consider ourselves perfectly well, would say that "we never could stand" going about almost without clothes as these husky little fellows are

doing, among the snow and ice. And yet these boys are patients in an institution for tuberculous children. All day they play, with next to nothing on, in the fresh air and sunshine. They sleep outdoors at night even when the mercury in the thermometer drops out of sight. They get lots of sleep and plenty of milk and eggs, green vegetables and other good food. They are taught how to

live healthful lives and when they go home cured they can tell you just what to do to avoid tuberculosis and what to do if you should catch it.

All this is very different from the way that tuberculosis used to be treated. In our grandmothers' day, if a little girl fell ill with tuberculosis the neighbors would say, "Poor child! Her father's people had the disease and so she was born with it. Perhaps she will get well if they are very careful to keep her indoors so she won't catch cold, and if they always close the windows at night, so she won't breathe the night air."

But, nowadays, we know better than this. We know that air and sunshine, rest and good food are the four best doctors in the world for tuberculosis. That is why the happy boys at the Perrysburg Sanatorium are out playing in the snow instead of being cooped up in stuffy bedrooms.

It is not a good thing for children, or for grownups either, to keep thinking about disease, but anyone who wants to be a good neighbor must know how to avoid catching disease and how to avoid giving it to others. Besides, tuberculosis is a very terrible disease. Every year in our country 160,000 people die of it. If that many people were killed in a great battle, how horrified we should be, but we are so used to tuberculosis that we forget to be horrified at it or to work against it.

Another good reason why children especially should enlist in the war on tuberculosis is that it, perhaps more than almost any other disease, depends for its cure not on the doctor, but on yourself. There is no medicine to cure tuberculosis. The way to avoid it and the way to *cure it are the* same—by wise living.

Like yellow fever, small-pox, measles and the other infectious, or "catching" diseases, tuberculosis is caused by a tiny seed or germ. Under a microscope the germ looks like a tiny rod. If these tiny rods are breathed into the lungs, they cause little lumps and the lungs, instead of being made of healthy tissue, are gradually filled with these sore spots, so that the sick person cannot breathe properly, but coughs and suffers. We are really more dependent on our lungs than on almost any other part of our bodies. We can go without water for some days and without food for weeks, even, but we cannot stop breathing for more than a few moments.

Tuberculosis gets its name from these little lumps that form in the body. You probably have heard potatoes, beets, turnips, and such vegetables called "tubers," which means that they are swollen *lumps* on the root of the plant, for the Latin word "tuber" means a swelling. So the word "tuberculum" means a little swelling, and tuberculosis is the disease which causes these little, sore swellings or lumps in our bodies.

The tuberculosis germs also cause swellings in the glands of the neck, and sometimes they attack the bones, especially in children.

But the main thing for us to know is how to fight tuberculosis. To know this, we must know how the germ is carried from one person to another.

Anyone who has tuberculosis of the lungs—"consumption," as we used to call it—is constantly coughing up the germs. You know that when we cough or sneeze, we send a shower of fine drops into the air. Now, if the consumptive is careless, and does not cover his mouth, these germs, in the tiny drops from his lungs, fly into

the air and are likely to be breathed into the lungs of anyone who is near.

Another and even more usual way for the germs to be spread is by the impolite, dirty and dangerous habit of spitting on sidewalks, and other public places. Of course, as you know, sunshine kills many germs outdoors, but often the sputum, or spit, dries and the germs are blown into the air before the sunlight has time to kill them. Often, too, peoples' shoe-soles pick up the germs and track them into our houses.

We can't very well make a rule that no one with tuberculosis shall spit in public places, for many people have the disease without realizing it. The only safe rule is not to let *anyone* spit in public, so almost all city Boards of Health have made this rule. As good citizens and good neighbors, let us promise ourselves *never to spit in any public place.* If everybody would make and keep this one promise, tuberculosis would soon be almost stamped out.

The next thing to do is to breathe all the clean, sunshiny air that you can. During the day, we ought to work in airy school-rooms or, better still, in regular, open-air schools. During the night, we should have our windows wide open, or, if we possibly can, sleep outdoors on a balcony. There is nothing like plenty of pure air to make the lungs and the whole body strong so that we can laugh at tuberculosis and all other germs.

Another way in which many children are weakened and so made more liable to tuberculosis is that they do not take proper care of their teeth. Tuberculosis germs *may find* a breeding place in the decayed tooth. The

word "rotten" is not a pretty or pleasant one, but it exactly describes the holes in a neglected tooth. The hole is full of rotten matter in which tuberculosis and other germs find food and can multiply. Don't let your mouth be such a disgusting place. Brush your teeth at least in the morning and at night—after each meal, if possible —so that no germs of disease can set up housekeeping there.

Another way in which we should all help to fight tuberculosis is by wiping out our old enemy, the fly. He loves to walk over spittoons and then take a jaunt on the supper table, leaving the germs from his feet on our food. Every good neighbor should fight him tooth and nail.

As I have said, there are two ways of guarding against infectious diseases. One way is keep away from other people's germs and to keep your germs away from others —that is the reason for the quarantine laws, the anti-spitting laws, the laws against public drinking-cups, public towels, etc. That is the reason why each one of us should learn not to put his fingers into his mouth or nostrils, not to "swap" candy or gum, not to suck his pencil or pen, or hold money in his mouth. All these are ways of *avoiding germs.*

But there is a second, and perhaps equally important way for each one of us, as an individual, to keep himself free from infectious disease and that is to live so sensibly, to take such good care of his body that it will be strong and able to fight against any germ that happens along. I know a little girl who is always "catching something." And the reason is that she eats all sorts

of foolish things between meals, drinks coffee instead of milk, sleeps in a stuffy room with two other people, forgets to brush her teeth and would rather sit curled up over the red-hot stove reading a story and munching

A Modern Health Crusade Pageant.

candy than go skating with the other girls. The result is that every germ that comes her way says, "Hurrah, here is just the home I've been looking for!" and settles down with her for a good, long visit. So Elizabeth keeps, as you might say, a hotel for germs and passes them on *to all her* schoolmates.

I wish that Elizabeth and every other boy and girl in America would join the grand army of those who are fighting this disease of tuberculosis. I wish every man and woman would join the National Tuberculosis Association and that every school child would join the Modern Health Crusaders.

During the war, many of you school boys—yes and girls too—envied your older brothers and sisters who were going as soldiers and nurses to fight the enemy of liberty and of America. Here is a chance to fight an enemy that has killed more Americans than were ever slain on the battlefield—an enemy that is right in our midst and that every one of us must help to kill. And it is the children of today, the school boys and girls, who can do the most in this war. If the school children of today would learn *how to live healthy lives,* in another generation tuberculosis would be almost unknown.

If you want to enlist in this fight, write to New York to the National Tuberculosis Association and they will tell you just how to bcome a Modern Health Crusader, which means how to be healthy yourself and how to be a good neighbor by fighting for your neighbor's health, also.

TUBERCULOSIS

By what four remedies are the children on page 301 making themselves strong and well? Have people always tried to get well this way? Which way is better?

Why are we reading a chapter on tuberculosis?

How is tuberculosis carried?

Have you an anti-spitting ordinance in your town? Is it kept? Why should you have such a law? What could you do to have the law kept better than it is?

How much time do you spend out-doors daily, or with windows open,

in-doors? Could you do better? Why is this an important thing to do?

When do you brush your teeth? How clean are they? How many decayed teeth have you? What can you do to improve your teeth this month? Why are these important questions to answer correctly?

Why should we swat-the-fly when we are trying to wipe out tuberculosis?

State the two ways mentioned in this chapter, to guard against infection. What laws do you know that help prevent the spread of infectious or contagious diseases?

Why do some people "catch" everything, while others seem to stay well? Read about the Modern Health Crusade once more and see why joining it will help you to stay well.

What are the most important ways to fight, not only tuberculosis, but all diseases?

CHAPTER XV

SEWAGE

As you study history, one of the most interesting things is to see how much people are alike all over the world and in all ages. People today seem to be, here in America, very much what they were thousands of years ago, in Europe.

Last summer, I was walking with a friend through a lovely ravine. At our feet ran a brook that made me think of Stevenson's poem—

"Dark brown is the river,
Golden is the sand."

Overhead, the sunlight sifted through the green roof in a gold and green pattern. We felt that we were in fairyland and planned to bring our luncheon and have a picnic—but suddenly we both stopped and cried, "Oh what a dreadful shame!"

There in front of us, almost choking the brook and crowding out the ferns, lay a mass of tin cans, boxes, broken bottles, bed-springs, garbage and all sorts of rubbish.

We looked up the bank of the ravine and there, perched on the edge above us, was a tiny shanty. My friend is always energetic and never afraid to say what she thinks. "It's a disgrace," she exclaimed. "Come on! I'm going right up there and tell that family that they ought to be ashamed of themselves to ruin this lovely place by dumping all their old refuse down here."

As she spoke, she was scrambling up toward the shanty. I followed her and we went together to the front door. Our knock sounded hollow, as if the house were empty. We knocked again, then went around and peeped in at the dirty window. Sure enough, the hut was empty, save for some dirty rags, papers and one broken chair that the family had left behind.

"I suppose," said my friend, as we half slid, half walked back down the ravine, "that family has moved on to some other lovely place and will ruin it, just as they have ruined our ravine. I'd hate to feel that I was like a bad fairy and left a *curse* behind me wherever I went."

I could not help agreeing with my friend. There are so many people who when they picnic in a beautiful grove or park, leave it littered with papers, banana skins and all sorts of rubbish, so that the next people who come there find not loveliness but ugly sights and smells. It is as my friend said—they almost seem to leave a curse behind them.

But, as I remarked before, people are the same the world over and ignorant people have always been careless of other people's rights. More than 2000 years ago, in ancient Rome, a short distance outside the city walls, there was set a line of stones. No one was allowed to dump rubbish any nearer to the city than these stones. But the Romans were lazy and careless, just like the people who spoiled our ravine. When the ruins of Rome were being dug up, this line of stones was uncovered, with a police notice cut in it saying that the rubbish must not be dumped inside the line. But evidently the Roman

housekeepers had not obeyed the rule, for under the police notice, someone had scribbled, in Latin of course, "Do carry the dirt a little farther; otherwise you will be fined." And so immense was the pile of decayed rubbish that even after 2000 years, we read that the men who dug up the ruins were almost overcome by the smell.

One of the greatest problems in a city of any size is

Paris Sewer.

how to get rid of the waste from the houses, the garbage, ashes and rubbish. In olden times, before there was running water in the houses, it was a common thing for dirty water and all sorts of refuse to be thrown from the windows into the street below. In Rome, a law was passed that anyone who injured a passerby in this way must pay him a sum of money—"damages" as it is called. But no damages were paid if merely the clothing was ruined, or, strangely enough, if the accident occurred *at night.* Fancy how pleasant it must have been to take a moonlight stroll in Rome!

The first sewers were merely brooks or other water-courses into which the villages dumped their waste. Naturally, such streams, as the villages became larger, grew to be smelly and unpleasant to look at, so they were roofed over. Then actual sewers were built of stone. In ancient Jerusalem, explorers have found the remains of many drains used to carry away the blood and refuse from the temple where animals were slaughtered on the altar.

The most famous sewer ever built is the great Cloaca Maxima (Biggest Sewer), of Rome. It has been in use ever since it was first built, more than 2400 years ago, and shows no signs of giving out. It is made of stones neatly fitted together without any cement and is twelve feet high. In the days of the wicked Emperor Nero, many a murder occurred at the drunken feasts, and the body was thrown into the Cloaca Maxima to float away into the river Tiber.

In early times in this country, we had no system of sewers. Even many large cities as recently as forty years ago, had no proper system for carrying away house waste. But in 1879, something happened that opened the eyes of people. The city of Memphis, Tennessee, had never been a very healthful place, but in 1879 a terrible outbreak of yellow fever occurred, and over five thousand people died. Of course, everyone was afraid to stay in Memphis and started to pack, and hurry fraid to stay in Memphis and started to pack up and hurry away to escape the fever, for this was twenty years before Dr. Reed and his helpers began their experiments in Havana and no one knew what caused the fever.

But the people in the neighboring states did not want

to catch the fever, either, and they stationed guards with shotguns on the border line between them and Tennessee, to keep the refugees out.

The country was so stirred up by this that a National Board of Health was founded and a committee appointed to find out what was wrong in Memphis. Now, as you know, the mosquito that carries yellow fever breeds in damp places, and the city of Memphis was fairly honeycombed with cesspools and vaults, many of them under houses or in cellars, for there was no system of drains so that the waste water from each house could be carried into the central sewer. The result was that the ground was soaked with filth.

The first thing that the committee did was to give the city a grand clean-up and the next was to do away with the cesspools and to build a proper sewer system so that the sewage was all carried away from the city. The epidemic soon died out and other cities, seeing how much more healthful Memphis had become, followed her example and built sewers for themselves. Nowadays, all the large cities have water in all houses, and drains by which the house waste can be carried into the street sewer and so away to a safe place.

But what is a "safe place?" That depends on the location of the city and on the number of its inhabitants. Where a city is situated on or near the ocean, the sewage can be discharged into the water, but the sewer should discharge below the point of low tide, otherwise, as the tide comes in, the sewage will be carried back to shore. Great care must be taken, too, that the sewage is not

poured out where it can be carried to bathing beaches, or where oysters can be infected with it.

If the sewage is emptied into a lake, it may be necessary to carry the pipe a long distance out from shore, so that the sewage shall not be carried back to the shore. In rivers, too, no city has a right to dump sewage if there are other towns just below who use the river water for bathing or drinking.

Most large cities are built near a river or ocean because in early days, water was the quickest and easiest route from place to place. So it happens that London, New York, Philadelphia, Boston, Chicago, Toronto and many other cities empty their sewage into the water. There the disease germs contained in the sewage soon die for lack of food and through exposure to the sunlight.

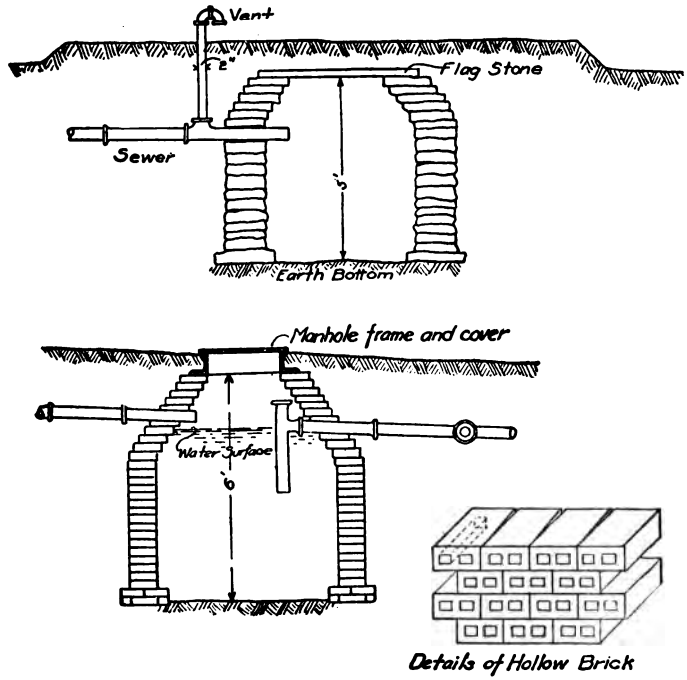
But how about cities that are not situated near a large body of water? What is to be done with their sewage?

I suppose you have often, in the country, seen a careless housekeeper throw a pan full of dish-water on the ground. If she does not always throw it in the same place so that the ground becomes soggy, or if it is naturally a sandy soil, so that the water quickly sinks through it, this does no harm. But if the water stands in a pool on top of the earth, the soil soon turns sour and smelly.

You remember that in talking about water, we spoke of how it is purified by filtering through the soil and how the seeds of disease are eaten up by the germs in the soil. Exactly this same thing happens with city sewage in a sewage filter. Great beds of sand, sometimes several acres of it, are made with coarser gravel or drains at the

bottom, and onto this sand the sewage is poured. It comes out at the bottom perfectly clear, odorless and clean. It is quite safe to drink it, though somehow the idea is not very pleasant.

Of course, in the country, where there is no big general



Two cesspools—one made of loose stone, the lower one of hollow brick or tiles; both allow "leaching" of the contents through the side walls and through the earth bottom. The extension on the right of the lower one is made of tile. Cesspools that overflow have been made satisfactory by such tile extensions.

sewer for each house drain to empty into, it is impossible to have such a great filter bed. In that case, the best way is for the house drain to empty into a septic tank. "Septic" means "causing decay" and in such a tank, the sewage actually decays. That is, everything but the min-

eral in it is eaten up by certain germs or bacteria and the liquid that is left is harmless and trickles away into the earth to rejoin the "ground water."

We sometimes speak of "Mother Earth" and I like to think of the earth in that way. She is like a great, kind mother who takes everything that might harm or annoy us and sets her tiny servants, the bacteria, to work so that it becomes harmless or even helpful. She can take the sewage from a great city and turn it into sparkling water to feed the underground springs and to nourish the trees and plants. All she asks is that we do our part and work hand in hand with her.

SEWAGE

What can you do to prevent the beautiful places near your home being spoiled by rubbish?

How long does history teach us, that men have tried to keep their cities free from garbage? What was the Roman law about garbage disposal? Tell what you think of how people in the old days got rid of their house wastes.

How did sewers come to be made?

What facts can you tell about the greatest Roman sewer—about its age, how it was built, its strange history?

Show by the history of the Memphis yellow fever epidemic, how this calamity led to a National Board of Health. How was Memphis made a healthful city? What effect did this work in Memphis have on the water supplies of other large cities?

When is it safe, and when is it not safe, to dump sewage in the ocean?

What can be done to make it safe to dump sewage into lakes? Into rivers?

Try to explain how sewage may be purified and safely disposed of in cities that have no bodies of water near by.

In which of the locations described in the last three questions do you live? Give reasons why you think the sewage of your town is *well* or *badly* disposed of.

Show by a picture, how a septic tank is made. Now explain how useful bacteria helps it work? Where should such septic tanks be used?

CHAPTER XVI

REFUSE

THE disposal of the sewage from the sinks, bathrooms and kitchens of a city is easier than the question of what to do with the garbage, ashes, tin cans, old bottles and other rubbish.

As I said, in Rome it was the custom for each house to dump its rubbish at a certain distance from the city wall, and in many country places in America each family still sees to its own rubbish, feeding the garbage to the pigs or chickens, or perhaps burying it, and dumping the ashes and other refuse in some out of the way spot. Sometimes the ashes are used for making paths and for filling in hollows and swamps. Too often, however, rubbish is just dumped anywhere and becomes an eyesore. There is no need of this, for with a little thought rubbish can be properly cared for. If the garbage is buried, it must be covered deeply enough not to attract flies or cats and dogs. Often a better way is to dry the garbage in a wire basket fitted into the fire place or stove pipe or even in the oven —then it can be burned.

Papers, unless they are sold to a dealer, can be burned. Every family that has to dispose of its own refuse should have a large wire basket in which rags, papers, partly dried garbage, etc., can be burned outdoors. Ashes, unless used for paths or filling in, and other rubbish should be hauled to some suitable place and covered with a thin layer of earth.

As the country road grows into a village street and the village street into a city thoroughfare, the problem of keeping it clean and attractive becomes still more difficult and important. In the city, the streets are in constant use by thousands of people. The streets are not merely used to get from one place to another, as they are in the country. They form the meeting-place and play-

ground, the center for transacting business, talking politics and paying visits, the evening promenade for the young people and playground for the children. It is absolutely necessary that the streets should not be littered with garbage, dirt and refuse, so that we may not carry street dirt into our houses on our clothing and shoes, so that food carried through the street may not be covered with dust, and so that we may enjoy playing, walking, or even eating on the sidewalks, as they do abroad.

Many cities do, in a wholesale style, what country *families* do in a small way—they get rid of their refuse

by dumping it. Sometimes, if the city is situated on the shore, the refuse is loaded onto scows and carried out to sea, where it is dumped. This is satisfactory if the load is not dumped too soon. Many a beautiful bathing beach is made ugly and unpleasant by floating bits of garbage and refuse carried in by the tide. Some beaches near New York have been almost ruined in this way.

Inland cities often fill in land that is marshy, or has been quarried out, by dumping on it the mixed garbage and rubbish or the rubbish alone. These dumps, however, are very ugly to look at, often smell very unpleasant and frequently form a fine breeding place for flies. Dumping refuse, either in the ocean or on land, is a very poor way of getting rid of it.

There are really only two good ways of disposing of

garbage and rubbish in cities. One is to burn them. In some cities the garbage is not kept separate from the ashes and refuse and so, being mixed with ashes, paper, etc., will burn very well. These cities can burn all their refuse in a great central building and by means of this fire, steam or electricity can be formed and sold, so that the refuse itself helps to pay for the expense of carting and collecting. In the city of Minneapolis, the burning of the refuse provides steam to heat the hospital and workhouse buildings, and electricity to light thirty-one miles of streets. In Savannah, Georgia, the city used to pay about eighty dollars a day for running its pumping station at the water-works. Since it has burned its refuse, the steam runs the pumping station and it costs only about forty-six dollars a day to burn the refuse and run the pumps—a clear saving of more than $12,000 a year. And in addition, the city has all its refuse destroyed, free of cost.

In many cities, the garbage, ashes, and other refuse must be kept separate. As wet garbage unmixed with ashes and paper will not burn easily, some other way must be found. This method is called "reduction" because by cooking and drying, the garbage is reduced to two substances, grease and fertilizer. Both of these can be made to help pay for the cost of collecting and reducing the garbage.

The war taught us all how foolish we had been to throw good food into the garbage pail and to dump tinfoil, bottles, shoes and other useful things into the trash barrel. American cities today are much less wasteful than they were eight years ago, and every one of us should do his part in helping to keep up the thrift habit.

Now what part have we, as good citizens, in seeing to the refuse of our city or village? In the first place, let's remember that citizenship begins at home. Our first duty is to see that our own garbage pail is tightly covered and clean, so that it will not smell unpleasant and so that passing cats and dogs or flies will not be attracted by it. Neither the garbage can nor the ash-can should be too full or they may overflow.

Our ashes we should put into a metal can, to avoid fire, and this too should be covered, so as not to have ashes driven about in the street air.

Papers should not be left loose, but neatly tied into bundles, so that they will not blow about. Just think what an immense difference it would make if everyone on your street worked together to keep the street looking clean and orderly. The trouble is that most people seem to think that the Street Cleaning Department, or the Board of Health, or *someone else* has the entire responsibility for clean streets, and a healthful city. They forget that the city is *their* city, that its streets belong to them and that no Street Cleaning Department can keep a city clean whose citizens are dirty, any more than a Board of Health can keep a city healthful if the citizens lead unhealthy lives.

In the olden times, city people had not only to keep their own sidewalks clean, as they do now, but the street too—unless they preferred to leave it dirty. When Benjamin Franklin lived in Philadelphia, about 200 years ago, there were no pavements in the streets, and, as you can imagine, they were perfect mud-holes in winter and

deep with dust in summer. The city was so very dirty, that its name, Philadelphia, was twisted into the nickname "Filthy-dirty."

Franklin lived near the Jersey market, and what with the wagons constantly driving in and the crowds of people who came there to market, it was ankle-deep in mud. Franklin succeeded in having a pavement laid, but this pavement was soon so thick with mud that it was nearly as bad as before. And of course all this mud was tracked into the Market Street houses and the dust blew in clouds into Franklin's dining-room window in summer.

Now Franklin was never the sort of man who grumbled and scolded and said, "Why don't they do something about it?" His way was always to do something about it *himself*. So he hunted up a man who was willing to clean all the pavements of the houses opposite to the market, if each house would pay him sixpence a month. This seems an absurdly low amount, but we must remember that in those days things cost very much less than now and people could live on far lower wages.

Then Franklin put into his newspaper an advertisement explaining his idea and sent a paper to everyone on the street. They all gladly agreed to pay the sixpence and so their street had the first street-cleaner in Philadelphia. Later, Franklin, wanting the whole city to be as clean as his own street, persuaded the Assembly to pass a law for paving the entire city and this was done and street cleaners were hired.

Now that we no longer have to carry away our own garbage and rubbish and clean our own streets, we must not feel that we have no responsibility. Every citizen

should help the street cleaners by keeping his own walk clean and by throwing fruit skins, newspapers and all such rubbish into the cans provided for them. About twenty years ago, the Street Cleaning Commissioner of New York City, Colonel Waring, decided that the children ought to do more to help keep the city clean. So he formed them into clubs called Juvenile Leagues. Thousands of New York's younger citizens are now enrolled in these Leagues, under the direction of a blind man named Mr. Reuben S. Simons. In a school where a League exists, a School and Street Committee sees that the school grounds and neighborhood are kept free from litter by the pupils. A Sanitary Committee calls on janitors and tenants to tell them about the city ordinances for keeping their premises safe and sanitary, and the members of a Vigilant Committee try to aid in keeping blocks where they live clean and safe. Those who join the League take the following pledge:

"We, who are soon to be citizens of New York, the largest city on the American continent, desire to have her possess a name which is above reproach. We, therefore, agree to keep from littering her streets, and, as far as possible, to prevent others from doing the same, in order that our City may be as clean as she is great and as pure as she is free."

REFUSE

What are some reasons why city streets must be clean and wholesome? Make a list of materials we call "rubbish" and tell what should be done with each.

What are some bad results that come from careless handling of rubbish in towns and cities? Are there any examples in your town?

What profit can a city make by burning its garbage and rubbish? Is your town's garbage burned? If so, with your class, visit the place, if you can arrange it, and report on what you learn, to your school.

Tell how grease and fertilizer can be obtained from garbage. What are advantages of this method of garbage disposal?

What duty has each of us, as a good citizen, about the family garbage can? About our ashes? About waste papers?

Can the city street cleaning department do its work without our co-operation? Find out, by studying your city ordinances or by writing to the proper persons, what the city requires of you, and what service it owes you, in respect to clean streets and alleys.

Tell the story of how Benjamin Franklin got paved streets and street cleaners for Philadelphia.

Describe the Juvenile Leagues of New York City. If there is nothing of the sort working in your school, organize such a league. Set yourself a list of good results you want to produce and see how many you can reach each month.

CHAPTER XVII

BATHING

MANY years ago, a famous chemist, Baron von Liebig, declared that you could measure the civilization of a country by the amount of soap it used. Of course, this is only partly true, but if we study history, we really do find that the great nations have always been the clean nations.

Greece and Rome, as you know, were the two great nations of the ancient world, and in both of them baths played a very important part in the people's daily life. The Roman bath-houses were especially magnificent. They sometimes covered land equal to a good many of our city blocks and contained gardens, libraries, gymnasia, etc. In fact, the baths, instead of being used merely for cleanliness, were really turned into club houses, where the Romans met to gossip and amuse themselves. If you ever visit Rome, you may see a beautiful church that was once a room—just a single room—in the great bath built by the Roman Emperor Diocletian.

In modern times, too, we find that the most wide-awake and vigorous nations, the ones that are advancing most rapidly, are those whose people keep themselves in good health. And one of the most important health habits is that of daily bathing.

In 1904 everyone was surprised when little Japan fought with and overcame the very much bigger nation, Russia. Now of course, it wasn't merely bathing that

made the Japanese so strong and so clever, but still it is true that the Russian peasants have always been very dirty, while the Japanese were the cleanest people in the world. At the time of the Russo-Japanese War, the city of Petrograd had only about sixty-two baths, while Tokio had about eight hundred. A Japanese who bathes only once a day is thought not so particular as he should be, and if you ever go to Japan, you will find that at every inn, you are, as a matter of course, at once given soap and towels and taken to the bathroom or the public bath-house.

Someone has called the skin a "third lung," because, like the lungs, it throws out, from its three million sweat glands, the waste matter that would otherwise poison our bodies. This waste matter actually amounts to more than two pounds a day, so it is easy to see how choked up these tiny waste pipes will become if they are not cleaned thoroughly and often.

For a great many years, the European cities have had public baths, but is was not until about thirty years ago that America began to wake up to the importance of keeping her citizens clean. As the doctors and scientists learned more about the human body and about how diseases are carried, they began to preach bathing as a preventive of sickness.

Of course a great many private houses, twenty-five years ago, had bath-tubs, but there were thousands and thousands of tenements that had no bath at all, and there were no public baths to which the people could go.

In cities built on river banks or by the sea, naturally *the cheapest* and easiest thing was to build floating baths

in the river or harbor and many cities did this. New York City spent $180,000,000 in building fifteen of these floating baths.

But you remember that, in talking about water, we saw how the water near large cities is always dirty and often contains disease germs. Mr. Simon Baruch, a man who has perhaps done more than anyone else to encour-

age the building of public baths in the United States, has called Manhattan Island "a body of land surrounded by sewage." Now you know that most people when they are swimming or jumping up and down in the water laughing and talking, are pretty sure to swallow some of it. So you can see that bathing in an open river bath near a big city may be pretty dangerous. New York finally decided that it was too dangerous to be allowed, and in 1914, these river baths were forbidden.

Very soon, however, these baths were fitted with water-tight tanks and filled with water from the Croton

River pipes. As they are re-filled daily and treated with chemicals to kill any disease germs, they are now quite safe and a great blessing to New Yorkers in broiling August weather, for New York, I am told, has the world's record for the greatest number of sunstrokes.

But baths like these can be used only in summer and as they are cold, they are more effective for refreshing and toning up the body than for really cleaning it. You know how hard it is to wash greasy dishes in cold water. In the same way, to dissolve the grease and dirt and make our three million waste-pipes really clean, we need hot water and soap.

In every great city, there are thousands of families who have no bath-tub. In New York City, there are almost 500,000 tenements without baths. How can these families keep clean?

In all the large cities and in many of the smaller ones public bath-houses have been built, where anyone who is free from contagious disease can have a bath either free or by paying a few cents for soap and a towel.

Of course, in our own families, we do not mind using the same tub, because we are all "good neighbors" and each one scrubs out the tub when he finishes his bath, but a big public bath-house is used by all sorts of careless, ignorant people. These baths are therefore provided with showers, so that there are no tubs to clean and no danger of one bather catching any skin disease from another. Each bather, too, has a fresh piece of soap and a clean towel which has been boiled, so that no disease germs can travel in it.

In some bath-houses, beside the showers there is a big swimming-pool. Everyone has to get thoroughly clean in the shower before he is allowed to go into the pool. In some pools, the water is constantly changed by pipes that carry off the soiled water and bring in fresh water. In others, the water is filtered very frequently and has chemicals put into it to kill the germs.

A City Bath House.

Several years ago, a chemist examined the water in the big swimming-pool at Amherst College. This pool held 75,000 gallons of water and eighty college boys swam there every day. The water had been in the pool for over three years and yet it was found to be perfectly clean. Now, the secret of this crystal-clear water was that it had been filtered every day and had been dosed with hypochlorite of lime two or three times every week. You remember that filtering will remove germs from the most polluted water and that there are chemicals that poison germs just as they do people.

I am glad to say that in most of our cities we are beginning to have not only public baths, but also school baths, where all the children who cannot bathe at home have a chance to get the bathing habit and to find out how much stronger and brighter and better a good bath makes one feel. The teachers say that after a bath the children are happier and more wide-awake. Besides this, the air in the school-room no longer has the sour, disagreeable smell that comes from unwashed bodies.

Many factories, too, have begun to supply baths for their employees. The owners know that baths keep the men in better health and happier, and that strong, happy people can work much better than sickly, sad ones.

As I have said, one of the great reasons for keeping clean is that it helps to check the spread of disease. A very wonderful proof of this was given by a noted man, Dr. Richard P. Strong in Serbia in 1914. The Austrian prisoners in Serbia were covered with vermin and these tiny insects, when they bite, often have first bitten someone suffering with the dreadful disease called typhus. So the germ is planted, by the bite, in the body of a well person and he falls sick. In a short time there were 300,000 cases of typhus in Serbia.

Dr. Strong, head of our Red Cross Commission, saw that the only way was to give every man, woman and child a bath, and so get rid of the vermin. So Serbia was divided into fourteen districts and through every district, from village to village, went a bath-train.

In the morning, before the train arrived, all the men were gathered in big tents beside the railroad-track. Many of them had not had their clothes off for months.

They undressed and when the train arrived, each man went into the first car and scrubbed with hot water and soap, then into another car where he had a shower bath. Then the doctor looked him over and sponged him with petroleum to kill any lingering insects. Then he put on his clothes, which had been washed, disinfected and dried.

In the evening, the women and little children went through the same process. For the first time in history, a whole country was forced to take a bath. And what was the result? In August, 1915, four months later, there were scarcely ten cases of typhus in all Serbia!

So all over America we are beginning to see that the Jewish Talmud was right thousands of years ago when it said "Cleanliness is next to godliness." Cleanliness does not always bring health, but health is seldom kept without it, and without health, we all know how hard it is to be happy and good either in our own homes, at school or with our neighbors.

BATHING

Why did Baron von Liebig say that civilization was measured by the use of soap?

Find in some Greek or Roman history a picture, in words or drawing, of one of the great public baths. Describe the process of bathing. What effect do you think this institution had on the appearance and health of the people?

What relation is there between health and cleanliness and the vigor of a nation?

Make a comparison between the cleanliness of the Russians and Japanese, during the Russo-Japanese War. If you can, find a description of Japanese baths. There is one in Kipling's "From Sea to Sea."

Recall what you have learned about the uses of the skin. What does this teach as to the need of bathing?

Why do we need public baths? How many homes in New York are without baths?

Describe the floating baths many cities have. Why were these closed in New York in 1914? How are the New York public baths *now* kept clean and safe?

What precautions can be taken to keep swimming-pool water safe? If you have a pool in your neighborhood, find out how its waters are kept pure.

Why should there be baths in public schools. In factories? Why shower baths rather than tubs?

Describe the "bath-train" which Doctor Strong took through Serbia in 1914. Why did he do it? What wonderful results did it produce?

Try to make a bath census in your town. How many homes are without baths? How many schools have baths? How many public baths and swimming pools have you? How are these kept pure? How many people use them yearly? By this count how civilized is your community?

CHAPTER XVIII

PARKS AND PLAYGROUNDS

Not long ago, I visited a family who had just built a new house—one of the finest houses I had ever seen. The children were delighted to escort me all over it. They showed me the bedrooms for each member of the family, the kitchen and dining-room, the library, the music room, which contained a grand piano and a pipe organ, their father's study, where he was going to work on his chemical experiments, the conservatory full of beautiful flowers, the beautiful grounds all around the house, the fine, wide halls that led from one room to another. Last, they took me to a great sunny playroom, big enough for a game of basket-ball, with a stage at one end where they could act out plays whenever they wanted to.

Of course only a very rich man can afford to build a house like this for his children, but as I walked home I thought that a city should be like a great, beautiful house. Its streets should be wide and clean like halls. It should have light, pleasant work-rooms. It should have a fine, large library. It should give concerts in great concert halls, where all the great family of people who call the city their home could come freely. It should have parks and hot-houses, playgrounds for all the children and for the grownups too. If every city were like that, I thought, we should not envy the rich man, for we should have all the pleasures of a great, beautiful house, and none of

the care of it—or only enough care to make us appreciate it.

When America was first settled, there was not much thought given to making towns beautiful or to providing pleasure and play for the townspeople. The early settlers were too busy fighting the Indians, clearing the wilderness and getting a living from the soil. Besides, there were no great cities here then. Around every village there was plenty of open ground where the older people could stroll, the young folks dance, and the children play tag and hide-and-seek. In New York City, the name "Bowling Green" still clings to the place, where, a hundred years ago or more, young New Yorkers used to come to play at bowls in the cool breezes from the harbor. As for the Bowery, with its shabby ugliness shadowed by the elevated road, it is hard to believe that it took its name from the lovely summer-houses and gardens of the Dutch settlers who lived here.

In those early days, not only were there plenty of play-places, but plenty of time for play. People did not feel, as they do now, that everyone, rich and poor, should be educated, and there were no free public schools to which all the children had to go. The children of rich parents were taught, but the poor children played until they were big enough to do a little work. Then they were set to work in earnest. Even an unusually bright boy like Benjamin Franklin, after only two years of school, was set to learning his father's trade of soap-making. So you see that children did not spend most of the day at school for nine months of the year. Nor

did the existence of great cities make it necessary to plan carefully for play-places.

But as the great cities grew, and children spent more and more time in school and grown people worked harder and faster instead of taking their time as their ancestors used to do, it became clear that the play-spaces were likely to be all built over with houses and stores and factories.

And as wise citizens realized this, they started to set aside pieces of ground for parks, so that even if people could not afford houses with ground around them, they could still have a place to enjoy the green grass and trees. If you go to Central Park, in New York, on a Saturday morning in May, you will see thousands and thousands of children playing on the grass, dancing around maypoles, playing tag or ball, or eating their picnic luncheon. Other thousands will be listening to a band concert, rowing on

the lake, riding in the goat wagons, or strolling along the shady walks.

Or you can take a steamer up the Hudson River to Bear Mountain, where the State has set aside a vast tract of wood, lake and mountain for the health and happy play of the people. The swings and boats are all

free and thousands of happy people, young and old, play there every sunny day all summer.

All over America, the people realize that they need play just as much as they need water and food, and they are building play-places. I read recently how the city of Port Pirie, in Australia, had built a ten acre playground in one day. Of course, they had everything *ready* beforehand, and it took three thousand workers to

do it, but everyone turned in and helped and by night the playground was ready. It has gardens for the boys and girls, a wading pool, a kindergarten and day nursery, a lecture hall, five big playgrounds for the older boys, younger boys, older girls, younger girls and the little tots. It has also a bowling green, place for throwing quoits and for open air moving pictures. And the nicest thing about it is that it isn't merely a play-room that one rich man

had built for his own children, but that it is a vast play-room that *all* the people built together for their children and themselves. That is what a democratic city can do!

But of course, in a big city, many of the people do not live near the park, or only near enough to go there once in a while. And the children want a place to play every day.

Many cities have arranged for part of the school hours to be spent in play. Often, too, the school yards are kept open, so that the children can play there after school and on Saturdays.

In many cities, certain streets, after school hours, are reserved for the children's play and no wagons allowed on them. In other cities, the backyards have been thrown into one by tearing down fences and making one big play-space for all the children on the block. This is especially good for the little ones whose mothers want to watch them from the window.

In 1906, the Playground Association of America was

A Recreation Pier.

formed with Theodore Roosevelt for its Honorary President. At that time only twenty cities in America had playgrounds. But the men and women who formed this association were good neighbors. They were determined that every American should have a chance to play, and now more than five hundred of our cities have playgrounds.

The cities that have a waterfront, like New York, are building second stories to their piers and having games, *folk*-dancing, and all sorts of fun there. Other cities

have been holding pageants showing the history of their town, or, like Northampton, Massachussetts, have organized a theatrical company to give really fine performances of good plays at a low price. All over our country, people are beginning to realize how much fun they can get by playing together, and how much healthier and more worth while it makes them.

You know that during the war, thousands of men and

Coney Island, Playground of a Great City.

women went to the camps here and in Europe just to amuse the soldiers, to help them to play, to keep up their spirits and health. That is what the people of every city should do. As you grow older, you will vote and pay taxes and have a voice in the Government of your city. I hope you will take an interest in the parks and playgrounds of your town, in its pageants, free concerts, picture galleries and all other things which make its people happier and more *alive.*

But while you are still school girls and boys, you can do a great deal. You can help by using the parks and playgrounds, by helping to keep them clean, by protecting the shrubs and flowers and newly planted grass. You can attend the concerts and visit the picture galleries. This may not seem to you like helping, but it *does* help, for it proves that such things are really useful and not silly luxuries which only rich people should afford.

As I said at first, I like to think of my city as a great house, and my fellow citizens as parts of a great family, all of us using the halls and rooms and gardens of our house and all of us helping to make them more beautiful all the time.

PARKS AND PLAYGROUNDS

Tell some interesting things about early New York which made it unnecessary for the people to plan for playgrounds.

Tell how changing times made people come to need parks and playgrounds.

Describe the nicest playground you ever saw. Did it need anything to improve it? How was it managed so as to give all the people a chance to enjoy it? Were grown people and babies provided for as well as boys and girls of your age?

How are playgrounds provided in crowded city streets, far from parks?

What is the "Playground Association of America?" Why was it formed? What are some interesting new forms of play and recreation it has introduced?

Does your town have public concerts? A public theatre? An art gallery? A museum? Tennis, golf, baseball, etc., facilities in public parks? Why are these useful to a community?

As boys and girls, how can you help to get such things or more of them, for your town? As taxpayers, when you are grown, what can you do?

CHAPTER XIX

DRUGS AND ALCOHOL

One of the pleasantest memories of my childhood is that of a visit to my great-great aunt. She lived in a dear old cottage, on land that her grandfather had bought from the Indians. I loved to roam through its low-ceiled rooms, and to wander through its old fashioned garden, sweet with heliotrope, lemon verbena and rose geraniums. Another delight was the garret, from whose rafters hung all sorts of dried herbs.

I remember these herbs especially, because while we were visiting Aunt Barbara, I caught a heavy cold and the dear old soul insisted on making me swallow a huge bowl of her "herb tea." It contained seven different sorts of herbs, she proudly said, and was made after a recipe that her mother used long ago, in England.

Nowadays, when drugstores are so close at hand and are ready to sell us a "cure" for every disease under the sun, we no longer think of drying our own herbs and making our own medicine.

I sometimes think that we should be far healthier and happier if we were not so eager to have things done *for* us instead of doing them ourselves, as our forefathers did. Our grandmothers went to a great deal of trouble to make their own jellies, preserves, pickles and sausage-meat, but their home-prepared food was delicious and, more than that, *they knew just what went into it.* They, to a great extent, made their own simple home remedies

for sickness, and if their liniments, herb teas and simple tonics were not very beneficial, they were at least harmless.

Nowadays, as you know, the Government, in order to protect us, requires every manufacturer of canned eatables to label the can plainly, so as to show exactly what the goods are. Corn syrup cannot be labelled "maple," and if dye or benzoate of soda is put into catsup or jam, it must be stated on the label.

The same thing is true of medicines. Anyone who makes a "patent medicine" must state on the label how much alcohol, cocaine, laudanum, or other poisonous stuff it contains. And it is forbidden to say, on the label of a bottle, that it can perform cures that it cannot.

But people, as P. T. Barnum used to say, seem to like to be fooled. Anything new and mysterious appeals to them. We laugh at the queer remedies that savages use, such as dried snakes, blood, animals' hairs, and other disgusting things, but we are really no more sensible than these savages. Many and many a man takes medicine about which he knows absolutely nothing, except what the label tells him—and unfortunately the labels often lie.

Of course patent medicines are often harmless, being made up of well-known drugs that anyone can buy for a fraction of the price. For instance, a well known tonic sells at the rate of four dollars and fifty-four cents per pound when it consists almost entirely of casein. Now casein is found in many foods and is best known as the curd in milk. And you know how cheaply you can buy cottage cheese, which is almost pure casein. Yet a man who would laugh at cottage cheese as

a tonic will spend ten times as much money for something that is no better, but is put up in a bottle with a fancy label. Another medicine widely advertised for asthma and hay-fever and selling at five dollars and eighty-two cents a

GUARANTEED BY ANGLO AMERICAN DRUG CO., UNDER THE FOOD AND DRUGS ACT, U. S. A., JUNE 30, 1906. SERIAL NUMBER 1098.
25 Cts.
MRS. WINSLOW'S
SOOTHING SYRUP
MADE IN U.S.A.
THIS BOTTLE CONTAINS FIVE PER CENT. OF ALCOHOL, ONE-TENTH GRAIN MORPHINE SULPHATE PER FLUID OUNCE, OIL OF ANISEED, CARRAWAY, CORIANDER, JALAP, SENNA, SUGAR SYRUP.
FOR CHILDREN TEETHING.
ANGLO-AMERICAN DRUG CO. SUCCESSORS TO CURTIS & PERKINS, 217 FULTON STREET, NEW YORK.
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pound was found to be nothing but milk sugar worth ten cents a pound.

But patent medicines often do worse than rob people of their money—they defraud them of their health. One of the wickedest things that is done is the making and selling of "soothing syrups" for babies. These syrups almost all contain laudanum, morphine, or some other

drug which deadens the pain, but which is very dangerous and may even kill the poor baby. Of course, the law requires that the label shall say that there is laudanum, or morphine in the medicine, but many ignorant mothers do not know what laudanum and morphine are and do not realize that they are poisons.

Since this is true, not only of laudanum but of strychnine, cocaine and many other poisons, the only sensible and safe way is to take no medicine but what the doctor advises, for no one wants to waste his money, injure his health and help dishonest men to cheat sick people. In this matter, it is everyone's duty, as a "good neighbor," to do his part by avoiding such dishonest medicines and warning others against them.

Of all drugs, the most widely used and the one which has caused the most suffering is alcohol. For years, it was used very commonly and the Government merely licensed the saloon, just as it licenses the drugstore. But the Government has found that it must forbid the sale except on a doctor's prescription, of laudanum, morphine, opium and other poisonous, habit-forming drugs, because people become slaves to these drugs, and other people, without any conscience or heart, are willing to make money out of these poor people by selling them the drugs. The Government has finally reached the same decision concerning alcohol and has forbidden its manufacture or sale, except for medicine.

This decision was reached after long years of study, experiment and argument. As a result of these years, it has been clearly proved that even moderate drinking

weakens the body so that it is more likely to fall a victim to any germ that comes along. It also injures the memory and power of attention. Drinking is responsible for a great number of accidents and causes an immense amount of poverty, suffering and unhappiness, both to the drinker and his family.

I have heard people say, "If a man wants to drink, it is his own affair. The community has no right to interfere in his private affairs." But such people do not stop to think that a drinking man is liable to injure a fellow workman, to wreck a train, to neglect his wife and family, and to ruin his own health so that the community has to care for him and for his family as well. Has the community no right to prevent this? Must the community stand quietly aside and let him not only risk his own life but also ruin other lives, leaving the community to pay the bills?

In 1917, before we entered the war, more than eighty-seven per cent. of the territory of the United States had forbidden the sale of liquor and more than sixty per cent. of the people lived in this "dry" territory. So it was not really such a tremendous change when, on November 21, 1918, the emergency "war-time" prohibition law was passed, nor when, on January 16, 1920, the Eighteenth Amendment to the Constitution proclaimed nation-wide prohibition.

Now that the sale of liquor is illegal, just as the sale of opium, cocaine, and other drugs is illegal, we shall have a chance to see just how much better off we are, how much more money we shall have for other and better

things, how much happier and healthier our cities will be, and how much better neighbors we can all become.

DRUGS AND ALCOHOL

Probably you have taken old-fashioned herb remedies for colds and coughs, or other sickness. What advantage have they over "patent" medicine of today? Were they always effective?

Why do we need protection by the Government from the sellers of medicines? What kind of protection do we get?

Give some examples that show how expensive it may be to buy widely advertised patent medicines.

Give some reasons why it is very dangerous to give babies widely advertised soothing syrups?

What is the *safe* thing to do about taking medicine?

On what *proofs* did the Government pass the "Prohibition Law" in January, 1920? *Why* is it not a man's own affair, if he drinks alcohol?

What percentage of the area of the United States already had some form of prohibition prior to 1917? What percentage of the population lived at that time in "dry" territory? What do these figures mean to you?

In what ways do we hope to profit from having prohibition?

CHAPTER XX

MAKING THE COMMUNITY SAFE

THE other day, after a heavy snow, I was walking down a very, steep, hilly street. It was filled with children on sleds careering down the slope with shouts of glee. Now there is nothing I like better than a good "coast", but as I looked at the children, I felt frightened, for I saw that their sleds were running right across another street, near the foot of the hill. I was just going to ask one of the boys whether he did not think it would be safer to coast in the park nearby, when what I was afraid of, happened. A load of children had just reached the cross-street, when a big truck appeared, right across their path.

If the boy who was steering had lost his head, I am afraid some or all of the children would have been badly hurt. Luckily, he had sense enough, and just time enough, to swerve the sled one side toward the sidewalk, where it buried its nose in a big snow-bank and all the children fell off into the soft snow.

I am glad to say that the danger, so narrowly escaped, scared the children enough to make them take their sleds into the park, where they could coast safely and happily.

As I walked on, I could not help thinking how queer people, grownups as well as children, are. We none of us want to be injured or killed, but almost all of us put ourselves and others in danger simply because we "can't be bothered" with being careful. People *will* walk on

railroad tracks, jump on moving cars, throw lighted matches about, keep poison in their medicine closets, dash across crowded streets and do dozens of other things that are dangerous to themselves and may cause injury or death to others. And the queerest part of it is that when one of these reckless people gets hurt, he generally

Dangerous Play.

seems to feel that it is not his fault at all. He blames the railroad, or the conductor, or the chauffeur, or anyone but his own careless self.

Now this recklessness is not good citizenship. It is not being a good neighbor, especially as every community pays out a vast deal of money to protect its careless citizens. I wonder if you ever stopped to think of all the various ways in which your city spends money to

protect you from danger. I do not mean the police and the firemen. They are, of course, absolutely necessary and everyone realizes how much they do. I mean the thousand and one little safety devices that guard us all from danger—the signals that warn our train of another train ahead, the fender on the trolley and cable cars, the

life preservers on the ferry and excursion boats, the fire escapes, the asbestos curtains at the theatres, the "isles of safety" in crowded streets, the air cushions in elevator shafts, the ridged treads on the steps of public stairways, the "watch your step" signs and many, many more proofs that the community thinks human lives worth saving.

All of these various efforts to protect life cost a city a great deal of money and it is up to every good citizen

to do his share so that that money shall not have been wasted. If the city requires my landlord to provide my house with a fire escape, and also provides a city inspector to test all fire escapes and see that they are strong and safe, isn't it rather lazy and mean of me to keep the escape so cluttered with boxes, bedding and all sorts of rubbish, that the fire escape is useless and my neighbors' lives in danger?

If the city spends thousands and thousands of dollars to pay firemen, feed fire horses and buy fire apparatus, isn't it contemptible of me to go right on throwing matches and cigarettes about, building bonfires, putting hot ashes into wooden barrels, leaving lighted lamps in empty rooms and doing other things that are likely to cause fires, injure my own property and very likely burn up my neighbors' houses and perhaps cost the lives of many people?

At every busy corner in New York, there is a policeman who does nothing all day but direct the automobiles and wagons, halting the traffic every now and then so that the people on foot may get safely across. And yet there are thousands of people hurt and killed every year in New York because they won't wait for the policeman to give the signal, or because they dash across in the middle of the street instead of crossing, as they ought, at the corner.

The city has spent a great deal of money in putting rubbish cans on the streets, but it is easier to throw a banana skin on the sidewalk than to carry it to the nearest can, so our sidewalks are often littered and made dangerous with fruit skins. By the way, did you know that horses

are very fond of banana skins? Why not feed them instead of littering the street?

People walk up public stairways with umbrellas under their arms that threaten to put out the eyes of anyone following them. They break bottles in the street, where they may cut the feet of dogs and ruin automobile tires. They rush violently through swinging doors, letting them strike the people behind. They spit in public places, spreading tuberculosis and other diseases.

Why do children, and many grown people, too, do these things? Not because they want to be disagreeable, not because they mean to injure others, but simply because they have never formed the *habit* of being careful for themselves and others.

Carefulness is really a habit, and this habit ought to be formed by all of us, as early as possible. That is why, in 1912, the American Museum of Safety was started in New York, to help school children to form the habit of being careful. In a great many schools, "Careful Clubs" have been formed and the girls and boys take pride in showing their good citizenship by helping, instead of hindering their city's efforts to protect them.

Here are a few things that every good neighbor should know, in order to be safe and to save others. Perhaps you can suggest some other things.

He should know that the right way to get on or off a street car is to *face the way the car is going.*

He should *cross a busy street only at the corner* and never cross any street without *first looking* to see whether the coast is clear.

He should know enough *not to touch a broken wire,*

but report it to a policeman. Live wires have killed many inquisitive people.

He should *never stand near the gate of an elevator* and always *"watch his step" in getting on or off* an elevator.

He should *play in safe places* and at safe times, not in crowded streets where automobiles, trucks and wagons make such play dangerous.

He should *never play with fire.*

He should always *look out,* when he passes behind a car or train, *for any car, train or vehicle coming in the other direction.*

He should not play or *"hitch" on moving cars,* trains or automobiles.

Probably you can think of a good many other "safety habits" that all good neighbors should form. But the first step in forming such habits is to realize that recklessness is not bravery and that to risk your own and other people's lives is just pure silliness. It is fine to disregard your own safety in order to save others, as the firemen do, but it is foolish and wrong to do dangerous things, just to "show off" or because someone dares you to. Our country needs all the useful citizens that it can possibly have and it spends lots of money—the money of your father and other tax-payers—to keep us out of danger. Isn't it only fair that we should do our part to make our community safe?

MAKING THE COMMUNITY SAFE

Make a list of all the devices that protect you from harm in your home.

Make a list of all the devices that you noticed on your way to school, which protect you from harm.

Make such a list for your school.

Are there any rules or devices, besides these, in your city, which you know about?

What do you think of the cost of such devices? Why are they thought worth while?

What coöperation must you give the city, to help keep your home safe from accidents? From fire?

What coöperation must you give the traffic officers to help keep the streets safe from accident?

Make up two original safety rules, not given in this chapter.

Learn the eight "Good Neighbor" rules in this chapter. Select ten which you think most important for school children from all the original rules brought in by your class and the eight in the book. Now make these ten rules into an attractive poster and put one in every room in your school. Next get every child to promise to learn and to try to keep these rules.

When is the *only* time it is fine to disregard your own safety?

CHAPTER XXI

BUILDING A CITY'S CHARACTER

One of the many wise men who have been interested in making our cities better and more beautiful has compared a city to a human body.

He calls the business section the city's heart, which works constantly, so that the city may live. We sometimes talk about a "live" city, for just as the body cannot remain alive without a heart, so no city can grow and prosper without a business center. In every "live" city, there is a Chamber of Commerce and other business organizations that work to make the city better, and more attractive so that people will like to do business there.

The water and sewer mains are likened to the arteries and veins, which clean and freshen the city and carry off its wastes, just as the blood does for the body.

The parks and open spaces are compared to the lungs, for without them the city would be choked and have no free breathing spaces.

The highways and railroads are like hands, for by means of them the city's food is brought to it.

The railway freight depots and the docks are compared to the mouth, through which the food enters.

The electric light and telephone wires are likened to the nerves, by which we are enabled to see, hear, and get in touch with the outside world.

The City Hall and other governmental buildings are like the mind by which the city is directed.

Lastly, this wise man remarked that the city, like each of us, has a *character and spirit.*

It is about this character in cities that I want to talk with you in this last chapter of our book.

Perhaps you think it rather far-fetched to talk about a city as if it were a person, and to speak of its character, but suppose we think of some famous cities.

The city of Washington is the center from which our country is governed and controlled, and where its law-makers meet to deliberate. The city itself has a carefully planned, deliberate character. It did not "just grow" like Topsy and as most cities do. It was chosen to be the capital because it was in about the center of the original thirteen colonies. Plans for it were drawn by a Frenchman, Major l'Enfant, who had served with our troops during the Revolution, and Washington himself took a special interest in the building of the city which was his namesake. I think something of George Washington's dignity and grandeur show very clearly in the wide noble vistas of the city of Washington.

The city of Boston, on the other hand, has no plan at all. The narrow winding streets of its older portions follow the cowpaths of colonial days. Boston fought its way against difficulties with real New England courage. It levelled hills, filled in marshes, built foundations and turned a little, irregular, ocean-swept town into a great and beautiful city, with fine theaters, art-galleries, churches and libraries. It has a true, New England character, independent, determined and original.

As for New York, it is like some people who are so many-sided that they seem to be many people in one.

Look at one side of her, and you think New York cares for nothing but business. Visit her theater district and she seems devoted to pleasure. Go to her great art galleries, her magnificent library and her beautiful operas and concerts, and you see that she loves beauty.

Yes indeed, cities have characters and those characters are made by the citizens of each city, just as the character of a room is made by the people who live in it. If you go into an ugly, disorderly room, you know that its owner is not fond of beauty and neatness. Just so with a city. If the streets are littered, if it is blackened with soft coal smoke, if its houses are crowded tenements, dingy and dirty, if its water is impure, if it has no parks or open places, you can be pretty sure that its citizens are lazy, dirty, ignorant people.

And the saddest part of it is that such a dirty, unpleasant city *keeps* people sickly, dirty and ignorant.

Now, if we live in such a city, what can we do about it? Perhaps you think that children cannot do very much. It is true that they cannot do everything, but they can do a great deal. They can help to keep their own houses and their schools so clean and attractive that their example will spur others to follow it. You know that Emerson says "The only way to have a friend is to be one." So the only way to *have* good neighbors is to *be* a good neighbor.

If I lived in such a town as I have described, I should try to see that my own sidewalk was perfectly clean. I should have a nice clean garbage can with a tight cover. My front windows should all be shining and bright, with clean white curtains of cheap material that could be

washed often. Then, outside the windows, I would have window-boxes of gay flowers and green vines. And I am willing to wager that inside a few weeks some of my neighbors would be polishing their windows and growing flowers, too. And after awhile, our block would be so bright and flowery that someone on the next block would wish he lived there, and would start to improve his house. And so the whole street would clean up and spruce up and the wave of cleanliness and beauty would spread over the city. Shakespeare says,

"How far that little candle throws his beams!
So shines a good deed in a naughty world."

Which means that no one need ever sit down in wrong surroundings and pity himself. If he *does his own part,* the light from his little candle will show others the right way and, little by little, things will improve.

I suppose no city ever had a more marked character or a greater influence than the city of Athens, which was a center of beauty and culture for the whole ancient world. And the reason was that it was a city of good neighbors. It is said that every Athenian, when he came of age to vote, took a solemn oath not only never to injure his city in any way, but to serve and work for it so that he might leave it a better, finer city than he found it. And the Athenians lived up to this promise so well that even today, after hundreds and hundreds of years, we admire the wonderful city of Athens.

One of the best citizens that America ever had was a poor boy who was brought up in a backwoods community and lived in a log cabin, but he loved his country so well and worked for her so unselfishly that he became Presi-

dent, and is one of our greatest national heroes. That boy was Abraham Lincoln, and I think every school boy and girl in America should take to heart his words:— "I believe that a man should be proud of the city in which he lives and so live that his city will be proud that he lives in it."

BUILDING A CITY'S CHARACTER

Let us talk about our city as if it were a person.

What shall we call its heart? Is it a strong enough one?

What shall we call its arteries and veins? Are they equal to its needs?

What shall we call its lungs? Are they large enough?

What shall we call its hands? Are they large and strong enough?

What shall we call its mouth? Does it take care of the city's needs?

What shall we call its nerves? Do they do its work well enough?

What shall we call its mind? Is it an intelligent and honest mind, directing the rest of the city-body well?

What is the character and spirit of your city? Perhaps you have never thought of this. Try to find out what people think of it by asking questions of some wise and intelligent citizens. Compare your city with what your book says of Washington, Boston and New York.

What does a city's character tell about its citizens? Do you like what your city's character tells about *its* citizens? Perhaps it would be well to ask the same wise and intelligent citizens to discuss this question for you, too.

How can a single person help to change the character of his town?

What lessons can we learn from ancient Athens about making a fine character for our own cities?

Learn, and try to live up to, Lincoln's words about a citizen's relation to his city.

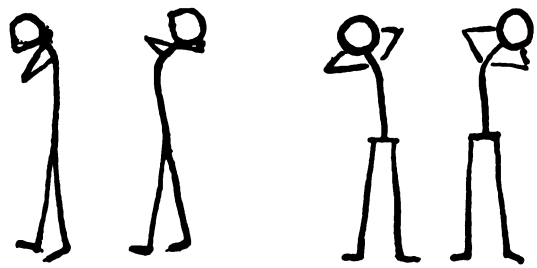
EXERCISES

By C. Ward Crampton, M.D., formerly Director of Physical Education, Health Instruction and Athletics for New York City Public Schools.

EXERCISE ONE—CHEST STRETCHING

Position: Standing.

Count 1: Clasp the hands behind head. Pull the head forward, lifting the chest and pulling the abdomen in.



Count 2: Push the head back as far as you can and look at the ceiling, taking a full breath and stretching the whole body comfortably. (Do not bend at the waist).

Count 3: Holding the breath, with the chest full, and keeping the head back, bend the body (without twisting) to the right side.

Count 4: Similarly, bend the body to the left. Continue for sixteen counts.

Number of Times: Four to six.

Rate: Five to six seconds for the whole exercise.

EXERCISE TWO—PUMPING OR ABDOMINAL SEE-SAW

Position: Lying on the back.

Count 1: Raise the chest as high as possible, pulling up the abdominal contents, and making the waist as small as possible.

Count 2: Hold this position, forcibly.

Count 3: Hold this position, chest still as high as you can hold it.

Count 4: Push down the chest and lift up the abdomen. The purpose of this exercise is to increase the capacity of the chest and to develop expansion. The circumference of the chest should be at least two to four inches greater than the waist, and there should also be two to four inches chest expansion, that is, the difference between the greatest and smallest chest measurement. This exercise should be done without breathing, from five to ten times, and then a rest should be taken for an equal number of deep respirations. A good way to learn this exercise is to place a small object *like* a watch or a pocketbook on the abdomen,

and pull it in on the first three counts, until it seems to rest on the front of the spinal column, and then push it up, but not so vigorously, on the fourth count.

Number of Times: Five, with an interval of fifteen seconds for relaxation and breathing, repeated five to ten times.

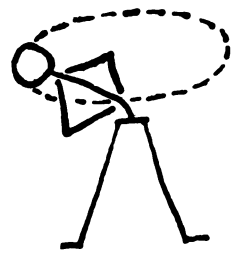
Rate: Four to five seconds for the exercise. Twenty to twenty-five seconds for five times.

EXERCISE THREE—THE STEM-WINDER

Position: Standing with the feet apart eighteen inches. Hands on hips.

Count 1: Bending the trunk *forward,* with the abdomen well pulled in.

Count 2: Circle to the *right,* keeping the abdomen in, until the body is bent over as far as possible.



Count 3: Continue the circle, bending the body *backward* as far as possible, looking at the ceiling.

Count 4: Continue the circle, bending as far as possible to the *left* and continuing again to the starting position, trunk forward.

This exercise consists of making as big a circle as possible with the head and keeping it as near the ground as possible, without bending the knees. Each time the head comes to the front, the abdomen is pulled in vigorously.

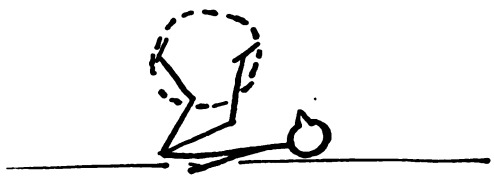
Number of Times: Ten to one hundred.

Rate: Two to three seconds for the whole exercise.

EXERCISE FOUR—THE BICYCLE

Position: Lying on the back, hands at the side, knees pulled up close to the chest.

Count 1: Extend the right foot and pull the left foot close to the thigh, beginning a small circle just as one would on a bicycle.



Count 2: Extend the left foot, continuing the bicycle movement. This makes the abdominal muscles strong, for it requires that the thigh shall be brought *close to the body* every time the feet move around in a circle. To get its best value, the knee should strike the chest at each revolution.

Number of Times: Twenty to one hundred.

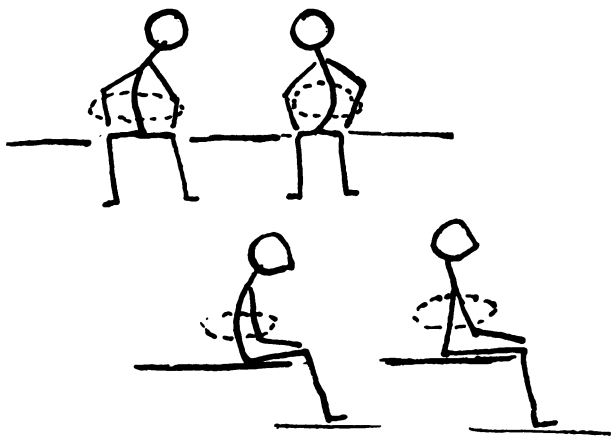
Rate: One to the second.

The beginner should rest every ten counts while five deep breaths are taken.

EXERCISE FIVE—CHURNING OR ABDOMINAL CIRCLES

Position: Sitting, hands on knees; knees separated.

Count 1: Bend the abdomen inward, letting the head and shoulders sink down, and bend the back, pulling in the abdomen.



Count 2: Bend the body toward the left, like a bow, keeping the head in exactly the same position, pulling in the abdomen on the right side and letting the right shoulder sink toward the right hip.

Count 3: Continue circling the abdomen from the left, forward, sitting up very high and straight.

Count 4: Continue the circle, bend the abdomen toward the right, letting the left shoulder sink down towards the left hip, bending in the body on the left side. The circling is continued from the fourth position to the first. *Thus the abdomen makes a circular movement in the horizontal plane.* The head and neck remain in one place and do not sway from side to side; the hips rock alternately up and down but remain exactly in their place.

Number of Times: At the beginning, twenty times right, twenty times left, increasing to fifty or one hundred.

Rate: One circle to each second. No faster.

These exercises are to be taken night and morning, consuming from seven to ten minutes. They are ideal for the sedentary worker who gets no exercise of the muscles of the trunk and who will develop in a few years chronic conditions of the stomach and intestines. These in turn will affect the heart, producing hardening of the arteries and, in due course of time, causing the characteristic invalidism and disability of sedentary workers, who take no exercise or who take exercises that are not good for them.

The five exercises given are the best that can be recommended generally for most people.

They are the result of a great deal of experience and scientific research. Of course, as one grows older, it is more and more necessary to have exercises which are especially adapted to the individual needs and peculiarities which may develop. The best and surest way is to have the doctor prescribe appropriate exercises, after he has given you his regular, annual examination.

30 ft.

O O L C

20 ft.

A P E O R

15 ft.

N P R T V Z B

12 ft.

S U Y A C E G

10 ft.

V Z Y A C E G

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